NATIONAL MUSEUM OF VICTORIA

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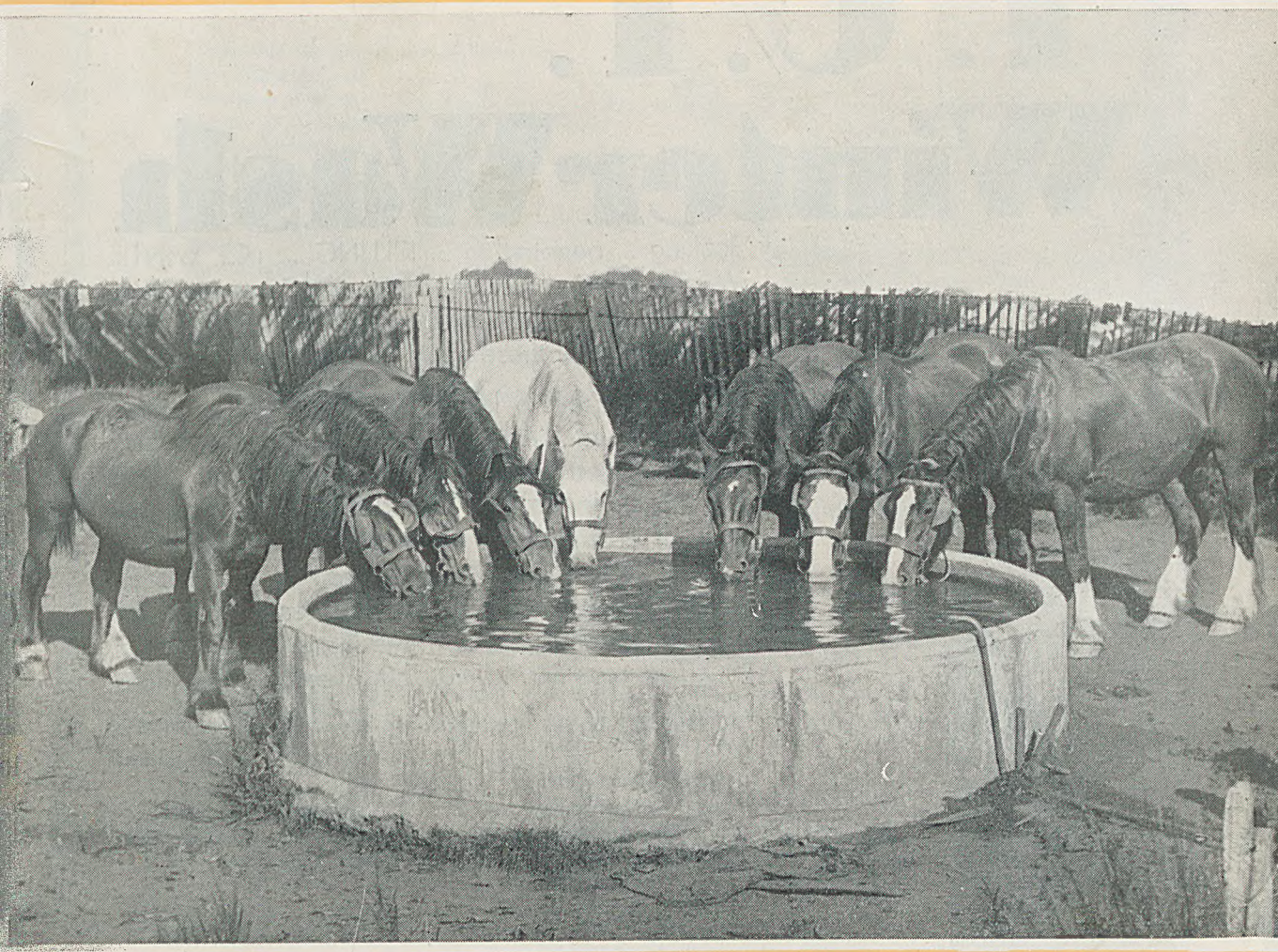

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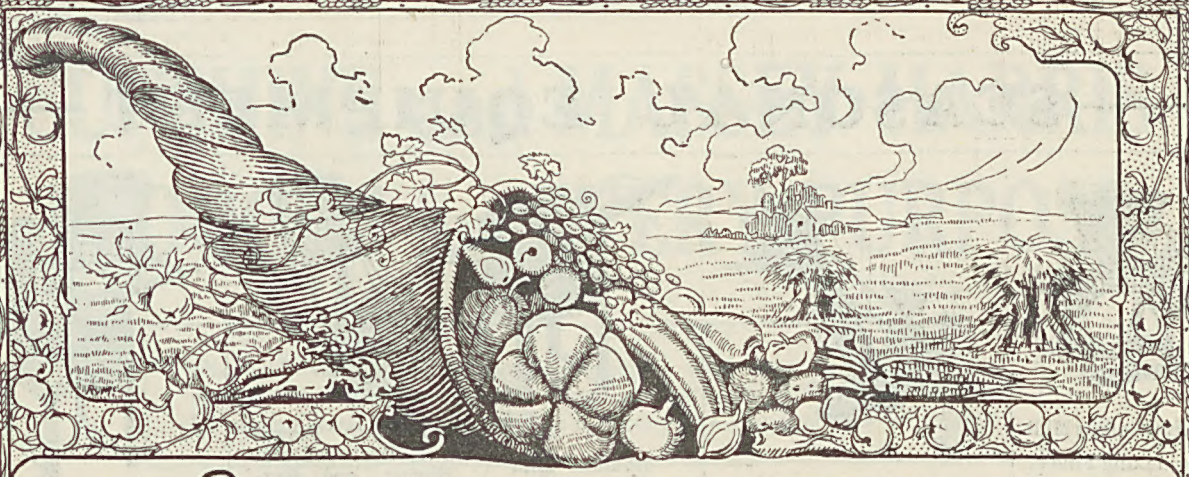

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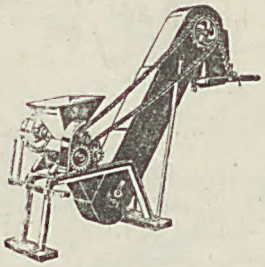

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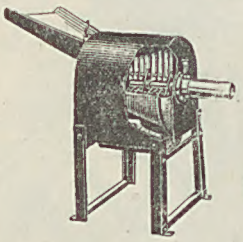

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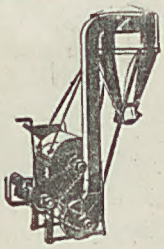

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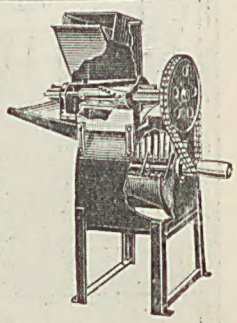

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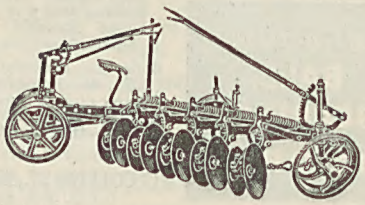

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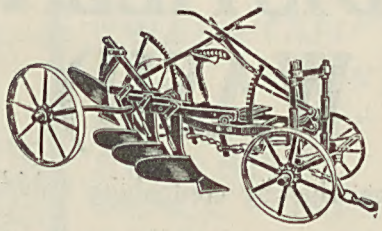

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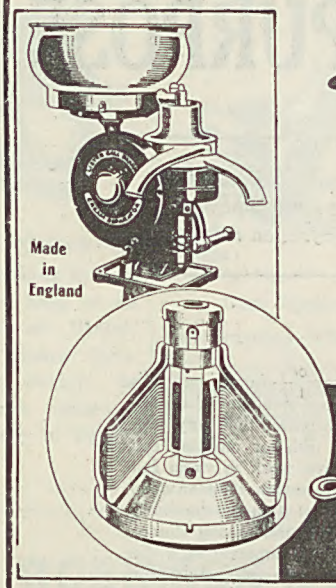

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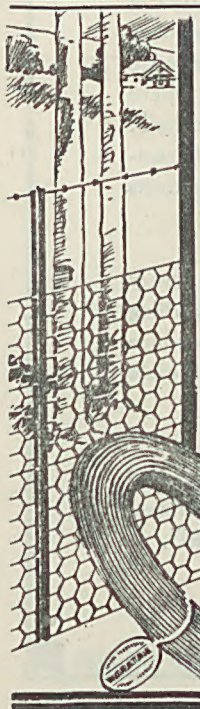

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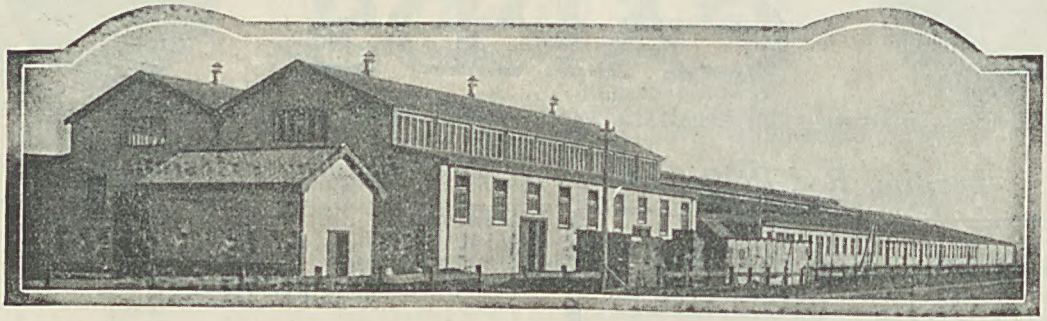

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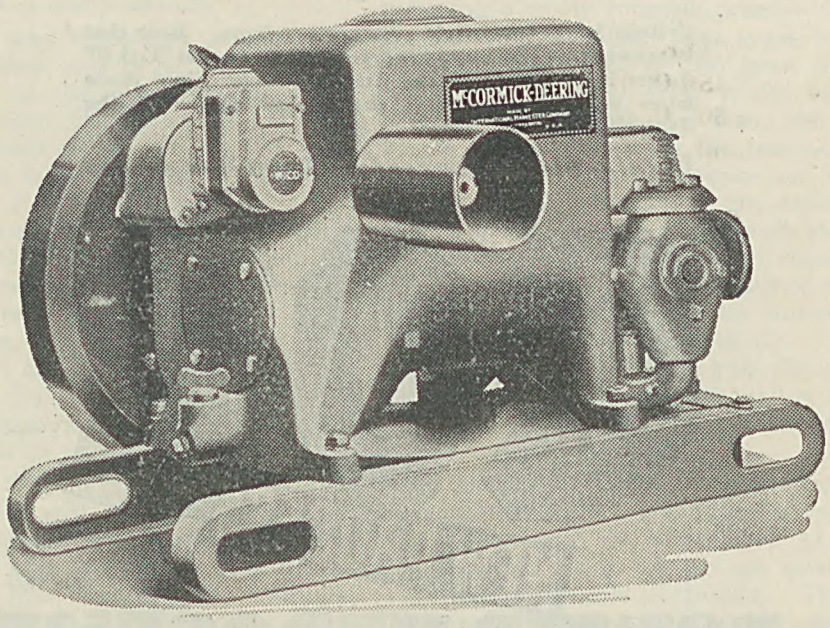

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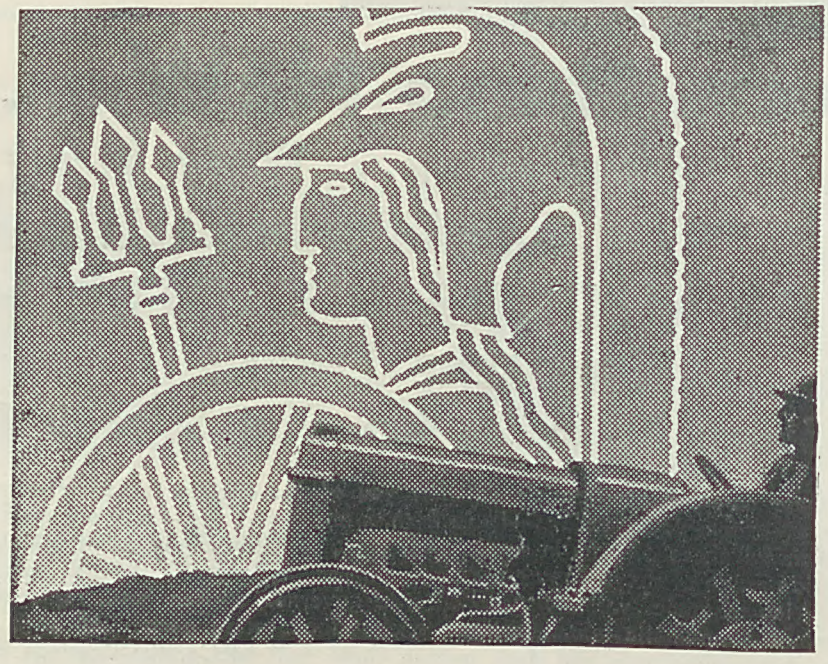

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The Journal of the DEPARTMENT of AGRICULTURE of VICTORIA

The Sowing and Management of Pastures

By J. E. Harrison, B.Agr.Sc., Agrostological Research Officer

THE sowing and management of pastures require a good deal of attention if success is to be assured, and farmers are urged to give sufficient thought to their own particular conditions, with regard to the time of sowing and the preparation of the seed-bed. Neglect in these directions will result in the establishment of an unthrifty pasture, and in addition will prove a costly venture.

Spring sowings may be adopted in some circumstances, say where late rains are frequent, although autumn is the customary time for seeding new pastures. Cultivation of the land should begin several weeks, or even a few months, earlier, in order that the soil may be in good condition for sowing down. It is important that the seed-bed should be clean, with a fine tilth and a firm surface. These requirements are secured by frequent cultivation, especially by several shallow workings after the first ploughing, and by the action of rain. It is of advantage also if sheep or cattle have been run on the land, as they compact the soil with their tramping, and only a light surface cultivation is needed to put it in excellent order for sowing.

A clean seed-bed will be free not only of weed plants, but also of weed seeds. To clean the land of weed seeds one has to secure their germination and then destroy the seedlings. This is done by having the soil worked down fine so that the weed seeds will strike with the first good rain of 30 points or more. From three to six days later the harrows may be brought into operation if the weather is suitable and the soil in good order for working. A stroke both ways will kill the weed strike and clean the land ready to receive the pasture seeds.

Though it is usual to leave land in bare fallow before sowing it down to pasture, it is becoming a fairly common practice to grow a summer crop of millet, sudan grass, or rape, as a preparation of the soil for grass and clover seeds. The summer crop, if fed off closely, leaves the land clean and firm, and enriched by the dung and urine of the grazing animals. It is necessary then to harrow the land once or twice only, according to the nature of the soil, in order to secure a very suitable seed-bed for pasture seeds. The general success which has attended this method makes it worthy of adoption in districts where the summer fodder crops may be grown successfully. Perennial rye grass, cocksfoot, and even the fickle Phalaris tuberosa are found to strike readily on such a seed-bed, as well as subterranean clover and white clover.

As soon as the soil is prepared and it is time to sow, the actual operation of putting in the seed should be undertaken at the first opportunity. Early sowings are most likely to experience favorable conditions. The soil has been warmed with the heat of summer and moistened with the first autumn rains, so that ideal conditions prevail for the germination

of seeds. The different kinds of seeds which make up a pasture mixture will each have an equal chance to germinate, grow and form a well-balanced pasture. Early sowing also allows the plants to become well rooted and strong before the winter sets in; they are

Soil preparation is important.

better able to compete with winter growing weeds and to resist the attacks of slugs, insects, and disease. The pasture is also ready for grazing earlier than a field sown late.

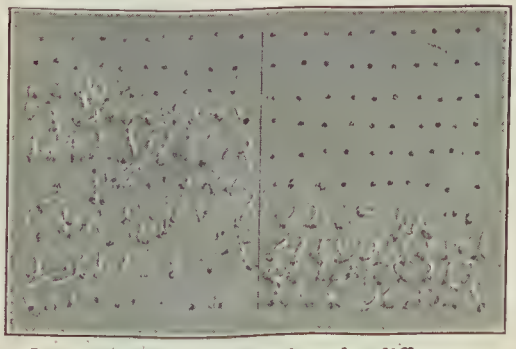
The actual sowing of the seed should be accomplished carefully and thoroughly. Usually the seed is sown on the surface of the soil and covered lightly with the harrows, though in moderately dry districts, rye-grass is often drilled in at a shallow depth, frequently on top of oat stubble.

There are several methods of sowing, but probably the ordinary wheat drill is most widely used for the purpose. Rye-grass seed may be sown separately through the seed-box, but a mixture is most conveniently sown with the manure through the manure box, the tubes being taken out of the hoes so that the seed may fall on the surface of the soil. The method of mixing is simple, the manure being spread out on a smooth floor or other surface, covered with the seed, and the lot then turned over several times with a shovel. As the superphosphate is acid, and will injure, and perhaps destroy the seeds of the mixture if allowed to stand even for a few hours, it is necessary to sow without delay. It will be found that the seed tends to work to the surface in the manure-box, but if the box is filled only one-third full, the trouble is not appreciable. It is convenient to carry an extra butt or so on the footboard, so that the box may be replenished as often as necessary.

Another method of sowing is by means of a hand broadcasting machine, a very useful implement, but not always giving an equal distribution of seed over the field. It throws heavy seeds further than light kinds, and for this reason is is best to sow the field in two operations. If this is done the heavy seeds may be mixed together first and sown separately in one direction, the light seeds being sown later at right angles. It is desirable to observe much the same precautions when broadcasting by hand, though more care still is necessary to secure a uniform sowing over the whole field.

A simple and effective implement called a barrow seed drill is used largely in England. This consists of a wheelbarrow which carries a drill operated by a drive from the barrow wheel. It is a light, workable implement, and where it has been tried it has given excellent results.

Whatever the manner of sowing, the important point is to secure an even distribution over the whole field. Very light harrows should be used to cover the seed. Chain harrows are a very suitable implement, and often brush harrows, made of boughs and the small branches of trees, are used successfully for the purpose. The operations should then be completed by rolling—twice for preference—with a roller of moderate weight.



Germination Test showing the difference between good and bad seed.

An application of superphosphate made at the time of sowing will remedy a natural deficiency of our soils, and will make available a plant food of which pasture seedlings, especially clovers, stand in high need. It is known from experiment that the phosphatic

requirements of a plant are highest when it is young, and so it is of more advantage to apply the manure when the seed is sown than at any other time. If the seed and manure are sown together through a drill, the manure falls in intimate contact with the seed, and very satisfactory conditions prevail for seedling growth. If the seed is broadcast, either by machine or by hand, it is desirable that the superphosphate should be applied at the same time to be available to the young plants from their first stages of growth.

Spring Sowings.

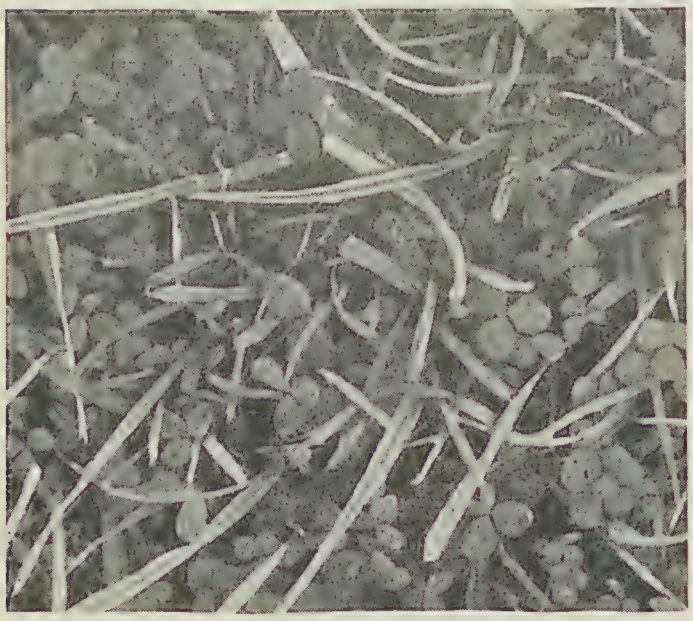
In districts of good rainfall—30 inches, or more, per annum—spring sowings may be undertaken with reasonable chances of success. The risk is a very dry summer, which may cause a heavy mortality amongst the young plants. In some respects it is an advantage to sow in spring, as the clovers then largely escape the attacks of pea mites, slugs, and the lucerne flea, and the competition of such weeds as cape-weed. In cold late districts it is probably better to sow in spring than in late autumn, as the seedlings usually get away quickly in the spring and more readily outgrow any checks they may encounter. A winter fallow usually precedes a spring sowing, and the operations of sowing down are carried out in the same way as for an autumn sowing. September is the most favorable month to sow down, and it is advisable to sow not later than the middle of October.

Surface Sowing.

Sowing seed of subterranean clover on natural pasture is a common practice in pastoral districts. It is generally a successful method of introducing this clover if regular annual dressings of superphosphate are subsequently applied.

When the clover seed is broadcast on existing pasture without any surface cultivation, establishment is uncertain, or at least very slow, and a good stand may not develop for several years. It is desirable, before the seed and manure are sown, that the surface should be broken or scratched with either a pasture harrow, a rigid tined cultivator, disc cultivator, or other similar implement. Both cultivation and sowing may be done in one operation with an implement like the combined drill and cultivator.

In districts of higher rainfall, the seed of perennial rye grass or cocksfoot is sometimes sown on established fields of subterranean clover, often with success. Best results appear to be obtained when the grass seed is broadcast in summer, and given an equal chance with other seeds in the soil when the first autumn rains fall. Though the practice is a risky one, it may be regarded as a good gamble on a more or less pure clover stand. No more than 2 or 3 lb. of seed per acre need be sown, as the plants will re-seed and multiply if a strike is obtained.



A good permanent pasture mixture with perennial rye-grass, cocksfoot, and white clover predominating.

Cover Crops.

New land is best broken and cropped on one or two occasions before being laid down to permanent pasture of high quality. Cultivation ameliorates the soil by aeration and weathering processes, and facilitates mowing, harrowing, and manuring of the established pasture by levelling the surface of the ground.

When the final crop of oats is put in before laying down a field to pasture, subterranean clover seed may be sown with it, either by mixing seed with the manure and drilling it

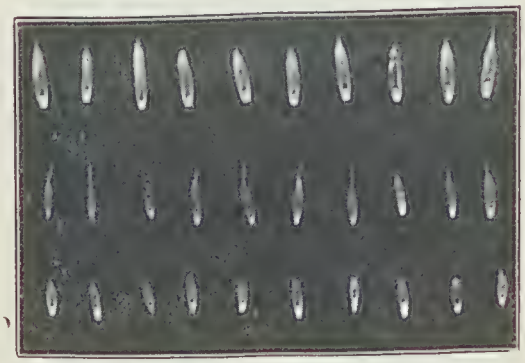
in with the oats, in which case a light seeding of 1 to 1½ bushels of oats should be made and drilling should be done on the shallow side; or the clover seed may be broadcast after the oats are sown. In either case about 2 lb. of clover seed is sufficient to establish the plant and secure a setting of seed sufficient to give a good strike the following year. Better results usually are obtained by cutting the crop for hay than by feeding it off. The stubble may be cleaned by light grazing during the summer, after which seed of perennial rye grass or cocksfoot may be drilled on the stubble, together with a dressing of superphosphate, with every chance of a successful strike.

Perennial rye grass may also be included with the subterranean clover at the time of sowing, but if cocksfoot is included, the seed should be broadcast after the oats are sown, as it will fail to germinate at the depth of drilling if buried with the oats. The inclusion of these grasses with the oat crop is desirable only when the land is fine and firm and in good order; if it is rough and lumpy, it is better to include the clover seed only and drill in the grass seed on the stubble in the following autumn.

Management.

If good seed of suitable strains has been used, and sowing has been carried out carefully and intelligently, as much as possible has been done to lay the foundation of a sound and satisfactory pasture. Given favorable seasons, its subsequent development will depend upon management, or the system of grazing and manuring adopted, as well as upon harrowing, mowing, and the like.

In the first year only moderate grazing should be given a new pasture. The young plants need lenient treatment if they are to make adequate root growth and produce abundant leaf in subsequent years. It has been shown by experiment that severe grazing restricts root development to such an extent that weakly and short-lived plants may result. The first grazing of an autumn-sown pasture should seldom be given before August, when it is best to turn in a large number of stock, graze the field rapidly, and then turn the stock out again. In a good growing season, such grazing may be given every three or four weeks throughout the spring, but care should be taken to leave a few inches of leaf on the pasture before the summer sets in. The leaf will shade the soil, protect the surface roots, and conserve moisture, as well as give protection to the young buds located in the crowns of the plants. The plants will continue to strengthen also, and will be ready to sprout again with the first autumn rains.



Rye-grass seeds: Top, Wimmera; centre, Italian; and lower, English rye-grass.

On established pastures an application of a soluble phosphatic manure early in the autumn is commonly desirable. This will stimulate autumn growth and again strengthen the plants to withstand the rigors of winter. It will make more feed available during the winter months, especially if the field is closed during May, and full advantage is taken of the last favorable weather for plant growth before the winter sets in.

The accumulation of animal droppings on the pasture should also be dealt with during autumn. These droppings, if left, cause rank growth with uneven grazing as the result. Various sorts of harrows are used for spreading the manure, a combination of zig-zag and chain harrows probably giving the best result. A further harrowing often is desirable at the end of winter before spring growth commences. This is especially the case with old pastures. In either case the objective should be to clean the field ready to make even and uniform growth, so that the stock may take full advantage of every blade that grows.

The grazing of a pasture should be regulated as far as possible, especially during periods of vegetative activity, usually autumn and spring, so that short periods of grazing alternate with longer periods of rest. A pasture plant is stimulated to make new vegetative growth by moderate browsing, but it requires a period of rest in which to make that growth. Continuous grazing weakens a pasture plant often beyond recovery, and should be carefully avoided, especially during autumn. A pasture

continuously grazed yields less nutriment per acre than one alternately grazed and rested. Unfortunately, many farmers often find themselves so short of grass, hay, and other food supplies that they are obliged to give their stock the run of the whole farm. As soon as possible, however, the fields should be alternately grazed and rested again, and the plants given the opportunity to recover from the check of constant browsing.

Summary.

The main points gone over may be briefly summarized. We regard the pasture seedling as a delicate organism, which should grow up under as favorable an environment as possible. Suitable conditions for germination are the first essential—a warm, moist soil, with a fine tilth and a firm surface. Once the seeds have germinated, the seedlings should not be obliged to compete with weeds, and the sower should have his land free of weed seeds as well as of weed plants. The young pasture seedling is known to need abundant plant food in a readily available form, and if phosphates have been applied at the time of sowing, the young plants will rapidly develop size and strength and take possession of the field as a crop is intended to do. Root development will proceed and sturdy plants will be formed. Grazing should be judiciously given the young pasture. Light grazing acts like a pruning, and causes the plants to stool or send out fresh shoots, and thicken up the sole of the pasture. At the same time it prevents tall-growing plants from overshadowing and crowding out low-growing plants like white clover. Continuous or too frequent grazing should be carefully avoided, however, as it weakens each plant in much the same manner as too frequent pruning would weaken a fruit tree.

Spring sowings may be undertaken with reasonable chances of success in districts of high rainfall. The risk is a very dry summer, which may result in the deaths of many young plants. Surface sowing on natural pastures is a useful means of introducing subterranean clover in pastoral areas; and in districts of higher rainfall, the seeding of 2 or 3 lb. per acre may be tried as a means of introducing perennial rye grass or cocksfoot into more or less pure clover stands.

It is a saving practice to include subterranean clover seed with the final crop of oats on land that is to be laid down to improved permanent pasture; and if the land is in very good order, the seed of perennial rye grass or cocksfoot may also be included when soil and climate are favorable.

The supplementary subject of mixtures and strains is dealt with in a reprint entitled "Permanent Pasture Mixtures, and The Principal Strains of Pasture Seeds," and is obtainable free from the Director, Department of Agriculture, Melbourne, C.2, upon request.

The Australian Merino

A GENEALOGICAL chart, showing the evolution of the Australian merino, prepared by Mr. E. N. Cox, has been issued by Messrs. Angus and Robertson Ltd., of Sydney. It indicates the interchange of blood that has gone to the making of this breed, and enables one to appreciate the variation between the studs of to-day and those from which they are descended.

The chart is composed of 38 Tasmanian, 51 New South Wales, 11 Queensland, 27 Victorian, and 13 South Australian studs—144 in all—and has been constructed to give a bird's-eye view of the passage of blood between them. Any breeder knowing the blood of his sheep can put his own flock on the chart and, by connecting up to his strains, have the whole pedigree complete. The chart covers the whole period from the first Waterhouse flock to the present day.

Its price is £1 1s.

Halo Blight of Beans

Control by Resistant Varieties

By S. Fish, M.Agr.Sc., Biologist, and A. T. Pugsley, B.Agr.Sc., Assistant Plant Pathologist

A report of the latest work carried out by the Biological Branch of the Department of Agriculture on the control of Halo Blight of Beans is printed elsewhere in this issue.

Following upon the investigations of varietal resistance, the general conclusion is reached that the use of resistant varieties will give an economic control of the disease. The actual resistant or moderately resistant variety to be planted by growers will depend not only upon its degree of resistance to halo blight, but also upon other characteristics which determine market demand.

The main varieties of beans are set out below under the headings of Very Resistant to Halo Blight, Moderately Resistant, and Susceptible, together with notes on growth characters. This should assist growers when considering the varieties to be planted.

Very Resistant Varieties.

Burnley Selection of Canadian Wonder.—This selection is more bushy and compact in growth compared with the Commercial Canadian Wonder, has darker green and shorter pods, and comes into bearing later. It also appears to be rather more susceptible to common bean mosaic.

Pale Dun.—A hardy, late variety, with short flat pods, but is considered to be a poor quality green bean.

Moderately Resistant.

Staley's Star (Sutton's Peerless or Canadian Express).—Tall growing, carrying pods high off the ground, prolific and hardy with pods almost round in cross-section. Only a fair carrier as a green bean.

New Discovery (Sutton's Satisfaction, also Abundant or Le Sultan).—A prolific bean, similar to Feltham's Prolific, but with longer pods (7 to 10 inches), foliage dark green.

Black Prince.—A prolific, black seeded, English variety. Almost stringless when the pods are young.

Black Wonder.—Very similar to Black Prince, and reported to be somewhat resistant to root rot (*Fusarium* spp.).

Feltham's Prolific.—An early variety, prolific, but with small pods 4 to 6 inches long, and stringy at a late stage. Foliage is dark green in colour.

Superlative.—A good English variety, similar to New Discovery; seeds black with a white mottle.

Ne Plus Ultra.—An early English variety; seeds light tan in colour.

Susceptible Varieties.

The following six varieties proved to be very susceptible to halo blight:—

Staley's Surprise (Sutton's Prince).—Early, prolific, with long pods carried rather low on the plant and tend to curl under dry conditions. Yield of seed low in comparison with the green bean yield.

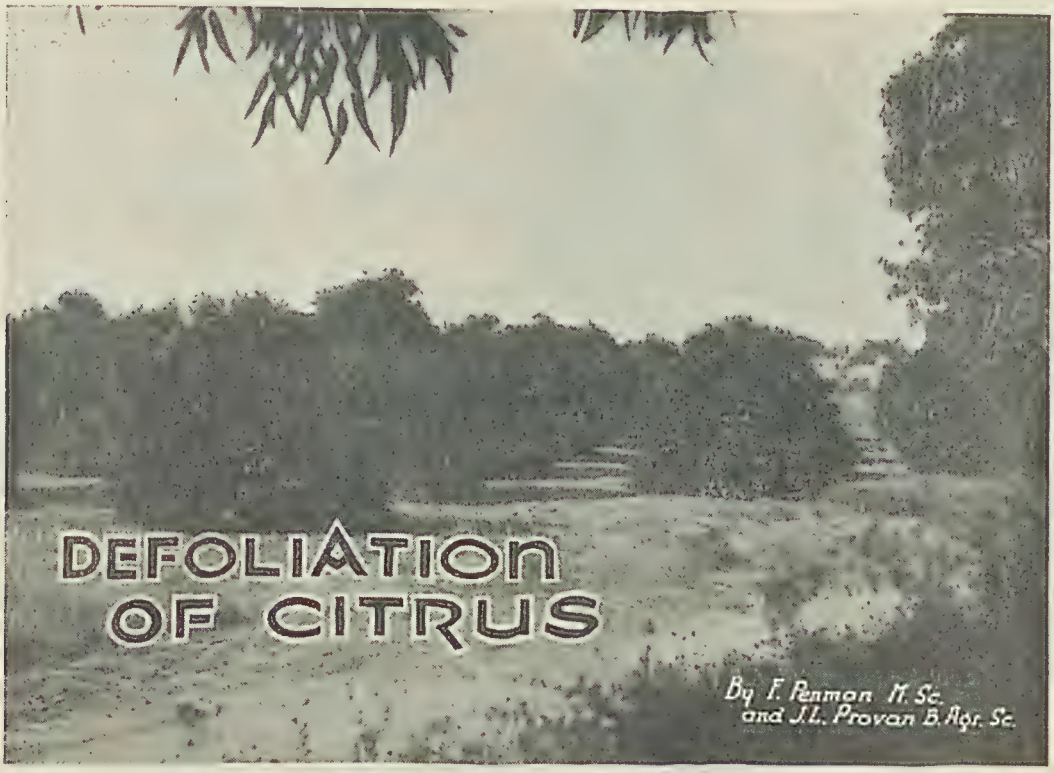
Staley's Brown Beauty (Sutton's Premier, also Acme).—Early, with long fleshy pods. Exceptionally prolific and an excellent green bean.

Canadian Wonder.—A prolific bean with long and fleshy pods. It is regarded as a very good green bean.

Afrikander (Masterpiece, also Marvel).—A prolific bean with a good type of pod.

Magnum Bonum (Flagelot Victoria).—Prolific, with long fleshy pods.

Tweed Wonder.—A selection of Canadian Wonder.



SUMMARY.—Investigation by the Victorian Department of Agriculture of defoliation of citrus in certain districts in Northern Victoria has traced its cause to salt injury, due to soil salinity, with faulty irrigation practice as a major contributing factor, especially with regard to prolonged withholding of water. Remedial measures suggested have given satisfactory results.

EXCESSIVE defoliation is not uncommon in citriculture. A variety of causes, or combinations of them, may lead to this condition. During the period 1932 to 1934 there were several cases of leaf-drop in certain districts of Northern Victoria, in areas not previously affected. Inspection of certain of the affected groves by Mr. D. Brown, Orchard Supervisor for these districts, followed by examination of samples at the Agricultural laboratory, indicated salt injury as the probable cause of the condition. In the spring of 1934, evidence of the increasing extent of the trouble, and a local suggestion that citrus blast (*Bacterium citriputeale*) may have been responsible for the damage, led to a reconnaissance of the districts in question, with the object of more complete investigation of the situation.

This survey definitely indicated soil salinity as the prime cause of the trouble in nearly all cases, some areas having as contributory factors either faulty irrigation practice, inadequate cultivation, or saline irrigation water. No evidence was found of the presence or activity of citrus blast. Subsequent work tends to support the conclusion that citrus blast is not a factor contributing to this problem.

Inspection of Groves.

Groves inspected for the purpose of examination were distributed over a belt of country about 20 miles long, in the north of the State. Affected areas were scattered almost at random among healthy trees and varied in size from a few trees to several acres. Affected trees showed a characteristic bare wood appearance following partial leaf-drop and a yellow tinge, often quite marked, in the remaining leaves. (See Figs. 1, 2 and 3). Intensity of affection varied very widely in individual trees, but, in the areas visited, complete defoliation and injury to the wood of the trees were rare.

Allocation of most of the trouble to salt injury is based on analyses of soils and of citrus leaves

Fig. 1.—Washington Navel showing early symptoms of defoliation. Location 8. Table I.

collected from normal and affected areas in these districts at the time of inspection in mid-December, 1934. Table I. shows the relation between the condition of trees as observed at this time and salt content of dried mature leaves. (Chlorine content as found by the method of W. L. Davies, Analyst 57, 1932, 79, expressed as sodium chloride).

In this arrangement of Table I., in increasing order of salt content of leaf, three groups have been segregated. The first includes trees of healthy appearance and with reasonably low salt content in their leaves, the third embraces trees showing high salt content of leaf and affected to some extent with the

TABLE I. CONDITION OF TREES IN RELATION TO SALT CONTENT OF LEAVES.

	Condition of Trees.	Location No.	Type of Tree.	Sodium Chloride in Dried Leaves.
				per cent.
Group 1.	Apparently healthy	1	Washington Navel	0·25
	Apparently healthy	2	Thompson's Navel	0·38
	Apparently healthy	3	Washington Navel	0·45
Group 2.	Moderately affected	4	Washington Navel	0·68
	Apparently healthy	5	Washington Navel	0·79
Group 3.	Affected	6	Washington Navel	1·23
	Affected	7	Washington Navel	1·43
	Early symptoms	8	Washington Navel	1·88
	Partial defoliation	9	Washington Navel	1·89
	Badly affected	10	Washington Navel	1·89
	Partial defoliation	11	Lisbon Lemon	1·95
	Badly affected	12	Washington Navel	2·35
	Affected	13	Washington Navel	2·81
	Badly affected	14	Washington Navel	2·94
	Badly affected	15	Washington Navel	4·07
	Badly affected, terminal wood dead	16	Thompson's Navel	5·98

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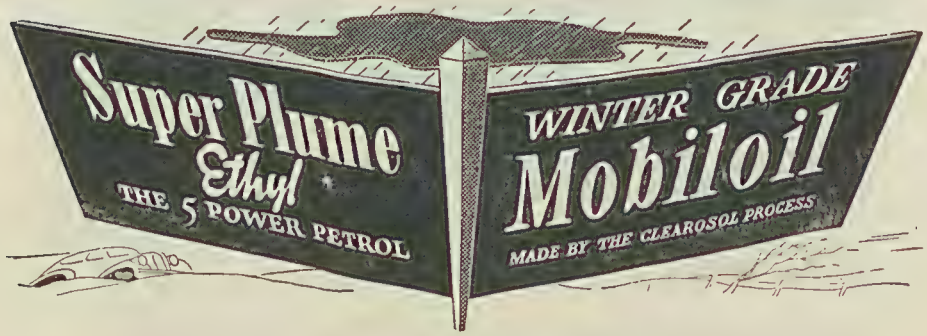


TABLE II.—RELATION BETWEEN SALT CONTENT OF SOIL AND OF LEAVES.

Location Number. (Refer to Table I.)	Condition of Trees. (Washington Navels.)	Sodium Chloride in Dried Leaves.	As parts per 100,000 of dried soil 0 to 3 feet.	
			Sodium Chloride.	Total Soluble Salts.
		%		
5	Apparently healthy	0·79	30	115
8	Early symptoms	1·88	53	166
15	Badly affected	4·07	482	not determined

Fig 2.—Defoliated Washington Navel, Location 15, Table I. Note the leaf-drop surrounding the tree.

symptoms described above, while an intermediate group shows fairly high salt content in leaves and may or may not be visibly affected.

A grouping of this kind is in accord with other results for citrus leaves recorded at the Agricultural Laboratory, and consideration of all the local data bearing on this matter suggests that sodium chloride content appreciably greater than 0.5 per cent. in dried citrus leaf indicates salt injury. (Compare H. S. Reed and A. R. C. Haas, Calif. Ag. Expt. Stn. Tech. Paper 17, 1924, pp. 40, 41, 47). It is significant that visible symptoms of injury supervened at a later date in certain cases, not in the districts at present concerned, where at the time of inspection trees appeared healthy and yet gave results for leaf salt of the order of 1 per cent. The interpretation placed on the result for Location 5 was that these trees were in danger, although apparently healthy at the time of inspection.

The varying symptoms observed at locations 8 to 11 of Table I. with virtually identical salt content of leaf, illustrate the influence of other factors such as irrigation and cultivation practice, type and age of trees, topography and soil type. With further reference to the last-named factor, however, it may be stated that there was comparatively little variation in soil type on the blocks inspected, most of the areas conforming to Tatchera Sandy Loam or the related Tatchera Sand (*vide* C.S.I.R. Bulletin No. 73, 1933).

In most cases the occurrence of high sodium chloride content in leaves is associated with soils containing considerable amounts of sodium chloride.

Table II. sets out conditions as found on a typical partially affected grove, as illustration of the relation between salt in soil and leaf.

It is evident from Table II. that there are related variations in salt content of leaves and of soil. Similar relations prevailed in other areas examined although soil salt was not of such high order elsewhere. For the affected areas at Locations 6 and 9 to 11 of Table I., it was known from soil survey work done in 1932 (C.S.I.R. Bulletin 73) that these areas were included in, or adjoined, salt affected regions.

Cause of the Condition.

The analytical data and the general nature of the affection, in addition to indicating salt injury,

pointed further to inherent soil salinity as the prime cause of the trouble. This was confirmed by the manner in which affected areas were distributed among healthy trees, a consideration which served also virtually to exclude irrigation water as a major cause of injury. In but one district was there any reason for giving further attention to irrigation water. In this settlement there had been a history of fairly high salt figures for irrigation water in certain parts of the system during summer and of wilting and general unthriftiness in certain garden plants following its use.

Analysis of a sample taken from the head ditch of an affected grove at the time of inspection showed that this water was quite suitable for irrigation. There is little doubt, however, that some of the water used in the past has been sufficiently saline to have an adverse effect on citrus, and to act as a contributory factor in the deterioration of some of the trees. Further consideration of this question is not warranted in view of forthcoming alterations in the local water system following installation of a new supply channel by the State Rivers and Water Supply Commission. This and other measures to be adopted may be expected to remedy the trouble, which was due to local stagnation and evaporation in parts of a lake, which formed part of the system.

Irrigation Practice.

Several aspects of the situation have helped to form the opinion that unsuitable irrigation practice has contributed to the trouble in all the districts at present concerned. An examination of watering schedules for certain blocks and of rainfall records indicated the possibility of under-watering. Confirmation was lent to this point by comments from local men on the state of the soil in certain bores made at the time of inspection. In several cases, local opinion was that the soils in question were not in need of water, while detailed examination at the time of inspection indicated that they were approaching wilting point.

Again, it usually is possible to keep citrus in health when sodium chloride content of soil does not materially exceed 50 parts per 100,000 for the surface three feet, in the absence of high water table. With the exception of the very high figure for Location 15 in Table II. all cases examined conform substantially to this arbitrary standard. In Table III. typical results illustrative of this point have been collected.

TABLE III.—SOLUBLE SALTS IN SOILS OF TYPICAL AFFECTED AREAS.

Location Number. (Refer to Table I.)	Condition of Trees.	As parts per 100,000 of dried soil 0 to 3 feet.	
		Sodium Chloride.	Total Soluble Salts.
8	Early symptoms ..	53	166
13	Affected ..	44	191
16	Badly affected ..	39	210

The influence of soil salts other than sodium chloride has not been discussed in this report, but has not been overlooked. The figures for total soluble salts shown in Table III. indicate fairly considerable concentrations, but in the first two of these cases and all others at present concerned, the bulk of the soluble salt present in addition to chloride is bicarbonate, which has less harmful effect than the other common soil salts. In the case of Location 16, sulphate contributes 48 parts of the 210 shown in Table III., and there are indications from previous work on this area that this unusual proportion of sulphate has influenced salt injury of trees to some degree.

The argument here is that the condition of the trees in most of the affected areas in these districts is rather worse than might reasonably be expected from the amount of soluble salt in the soils, this opinion being based on experi-

Fig. 3.—Row of Washington Navel trees near Locations 5, 8 and 15. Showing increased severity of symptoms towards end of irrigation run.

ence in other districts with similar soils. It is likely that insufficient watering has intensified the effect of soluble salts in the soil. (Compare W. P. Kelley and E. E. Thomas. "The Effects of Alkali on Citrus Trees," Calif. Ag. Expt. Stn. Bul. 318, 1920, p. 309).

Consideration of the several aspects of irrigation practice discussed above suggests that inadequate watering has contributed to the trouble experienced in these districts. There has been a deliberate policy of withholding of irrigation water on many blocks in this region in recent years, following striking demonstrations of the dangers attendant on excessive use of water. Although in some cases marked improvement in condition of trees has followed the adoption of this practice of withholding water, it appears that this policy has been applied in a manner too drastic for best results. In explanation of the improvement in trees which have had no irrigation for periods as long as two years, it is probable that the trees were suffering formerly from salt injury and that the watering system was such that there was further accession of salt to the root system at each irrigation. Obviously under such conditions complete elimination of irrigation water might be expected to lead to improvement in the condition of trees, provided natural rainfall sufficed to keep soil moisture above a certain critical level. It is very probable, however, that harmful soil desiccation occurred to some degree during the year or so prior to inspection in certain of the areas involved, and that it was a factor of some importance in contributing to injury to the trees.

Fig. 5.—Defoliated Washington Navel tree showing subsequent recovery. Effective use of this new growth was reduced by the omission of pruning before remedial measures were adopted.

Fig. 4.—Washington Navel trees, adjacent to Location 3, showing improved vigour following flood irrigation after former early symptoms.

Remedial Measures.

An indication was given above that irrigation technique in many cases has been of unsuitable character for soils subject to salt affection, the system being such that salt tends to concentrate in the root zone. Salt moves in the soil with any advancing water front and the effect of the furrow system used almost exclusively on the areas inspected has been to drive salt with the water front penetrating through the soil from the furrows towards the main root zones of the trees. Partly for a similar reason, salt tends to accumulate at the bottom of the irrigation run as at Locations 5, 8, 15. (See Table II. and Fig. 3). In this case all the badly affected trees were located in the two lowermost rows of the run, the zone of trees affected to some degree extended for a further five rows, while the upper

13 rows were healthy. Conditions similar to these in all respects have been investigated by the Department in other citrus districts of the State.

Measures which have proved effective elsewhere are recommended for those areas liable to salt trouble. The ordinary furrow system of watering should be replaced by a flood or basin system or any scheme designed to apply water as close as possible to the tree and to allow soakage of water, and therefore movement of salt, away from the main root zone of the tree.

Opportunity exists in these areas for removal of considerable quantities of salt from dangerous proximity to the roots by leaching of the kind described, this opportunity being presented because of the absence of high water-table. In no case was a water-table found close to the surface, a typical instance being one in which holes to eight feet had been dry for the past two years.

A system of rational frequency of irrigation, applied in accordance with the principles outlined, together with the necessary attention to cultivation, pruning and manuring of damaged trees was recommended in the belief that such treatment would show response in trees lightly or moderately injured. In cases of severe damage to a few trees only, replanting appeared desirable, while for severely damaged areas of appreciable size replanting to vines was considered by the holders. In any case, recognition that injurious conditions of soil salinity are likely to occur on the blocks concerned, and modification of existing practice along the lines indicated to meet this situation and prevent recurrence, are of vital importance in management of this type of land.

Recent History of Affected Areas.

Several opportunities have been taken for observation of the results of application of measures outlined above. In many cases definite improvement followed adoption of flood or multi-furrow irrigation. Partially affected trees made immediate response (Fig. 4) and even badly defoliated trees showed fresh growth (Fig. 5). This improvement has been sustained throughout the past growing season.

In the case of Location 16, Table I., the most severely affected of those investigated, no adequate remedial measures have been instituted, and the position has become worse. This area probably will be planted to vines.

Although the recommendations made have been applied in full in but few cases, the general response to treatment has been satisfactory. A further beneficial result of this work is that flood irrigation has been more widely adopted in these districts in general, following demonstration of its effectiveness in inducing new vigour in the affected areas investigated.

Parasites of the Horse

By W. D. Shew, B.V.Sc., Senior Veterinary Officer

THE horse, like other animals, may become infested with various parasites, both internal and external. Some of the more common internal equine parasites are bots, round worms, and tapeworms.

Bots.

The Bot Fly or Horse Bee, as it is often called, is known to cause considerable loss to horse-owners in most parts of the world. In North America, Great Britain, Europe, and Asia, as well as in Australia, serious efforts are being made to control the ravages of this pest.

Bots may cause injury which, in some cases, may result in the death of the horse, in one of the following ways:—

(1) By the fly itself, during the process of egg-laying, annoying the horse while at pasture or at work.

(2) In the larval stage, by the withdrawal of nutriment from both the stomach and its contents.

(3) By the actual obstruction of the passage of food from the stomach to the intestines, especially when the larvae are collected in numbers about the pylorus or exit door to the stomach.

(4) By injury and irritation to the mucous membrane lining the stomach, due to the penetration of the hooklets by which the larvae are attached.

(5) By irritation, injury and possible penetration of the intestines, rectum and anus, in the passage of the larvae from the horse.

If the stomach or intestinal walls are penetrated by the bots, peritonitis often is set up, and this generally causes the death of the horse. It should be remembered, however, that it is really seldom bots actually cause death. Because a post-mortem examination on a dead horse shows the presence of bots, they should not necessarily be blamed for the death unless they have penetrated the stomach or intestinal wall causing peritonitis or have actually caused a stoppage of the bowel.

The eggs are pale yellow in colour, and are attached by their lower third to the horse's hairs. They do not hatch out until they have been licked by the animal. The moisture and friction of the horse's lips causes each egg to open when a tiny larva or maggot emerges. From the lips this little maggot works its way into the mouth, and burrows into the muscles under the tongue. It remains in this position for three or four weeks before it is swallowed and becomes attached to the walls of the stomach or the first few inches of intestines. In three or four months the bots reach their full size, and are passed out on to the ground where they burrow, and in two to four weeks emerge as mature flies ready to lay more eggs.

The eggs may be removed from the horse's coat by rubbing vigorously with a 2 per cent. lysol solution, the friction and moisture hatching the eggs, and the small larvae are then destroyed by the disinfectant. Horses heavily infested with eggs are best treated by clipping and burning the hair, thus destroying the eggs.

To remove the bots from the stomach, the following treatment is advised:—Feed the horse for two days on bran mashes, then fast for twelve hours. The horse should then be given a ball containing carbon disulphide. The dose of this drug is 6 drachms for a horse of about 1,000 lb. weight. No food or water should be given for at least four hours, and on no account should the dose be followed by a purgative; oil especially is dangerous.

It is inadvisable to give a purgative before dosing, and great care must be taken when balling the horse, as should the capsule break in his mouth and the drug get into his lungs, serious consequences may ensue.

Young and small horses should receive proportionately smaller doses, while very old or debilitated animals should be looked upon as risky cases for treatment.

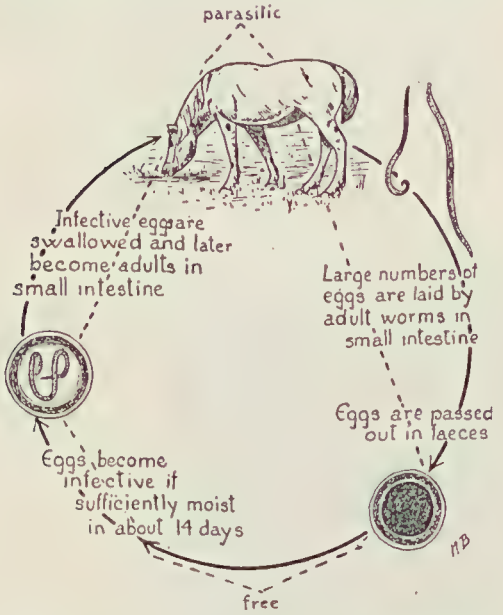
Bots may be passed for two to three weeks after treatment, individual horses being known to evacuate 500 or more, while in extreme cases 1,000 have been found in the abdominal contents.

Round Worms.

The small round stomach worm, *Habronema* is quite common, and is found usually in the stomach, either free in the ingesta or in nodules in the stomach wall. These nodules contain a small amount of pus in which the adult worms and eggs are found. The worms usually are about one-quarter to three-quarters of an inch in length, and there are three common species, viz.:—*Habronema muscae, H. microstoma,* and *H. megastoma.*

The eggs and larvae are passed out in the faeces, and later are swallowed by the common house fly, or by the stable fly, and stable manure is the common breeding ground for these flies.

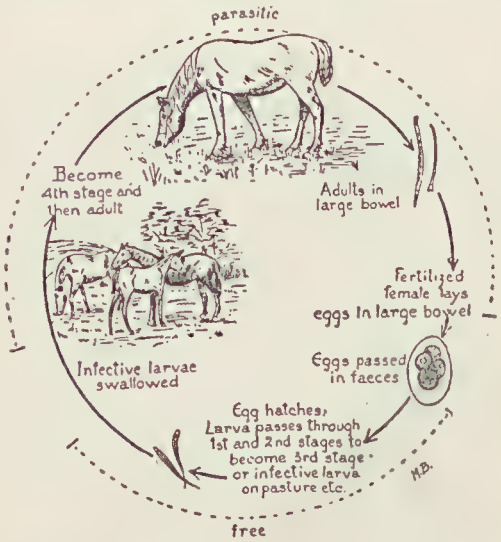
Horses may become infested by swallowing either dead or living flies, or larvae which may escape from the proboscis of the fly while it is sucking moisture from the horse's lips or nostrils. The so-called "summer sores" of horses, common along the Murray river, and that condition of horses in the Northern Territory, known as "swamp cancer," which are so difficult to heal, frequently are found to contain *Habronema* larvae, and although it is uncertain whether they cause these sores, or


parasitic
Infective eggs are swallowed and later become adults in small intestine
Large numbers of eggs are laid by adult worms in small intestine
Eggs are passed out in faeces
Eggs become infective if sufficiently moist in about 14 days
free
M.B.

Showing the life-cycle of a typical round worm. [*Vet. Record.*

are simply deposited there by flies, they certainly delay the healing processes.

The large round worm of the horse, the *Ascaris,* varies from 8 to 16 inches in length. This worm passes portion of its life history in the lungs, and in this way sometimes sets up lung irritation, creating a form of bronchial catarrh. When the worm reaches maturity in the stomach and small intestine,


parasitic
Become 4th stage and then adult
Adults in large bowel
Fertilized female lays eggs in large bowel
Eggs passed in faeces
Infective larvae swallowed
Egg hatches, Larva passes through 1st and 2nd stages to become 3rd stage or infective larva on pasture etc.
M.B.
free

The life-cycle of a Strongyle. [*Vet. Record.*

it apparently causes little harm, except in those somewhat rare cases where it is present in very large numbers.

The Pin Worm or Oxyuris varies from 1 to 6 inches in length, and is found in the large intestines. The female of this worm when about to lay eggs attaches itself inside the rectum and causes intense irritation about the tail and anus.

A very troublesome group of round worms, known as *Sclerostomes,* includes the deadly strongyles, red or blood worms. Unlike those already mentioned, many of which cause little damage to a well-nourished beast, the *Sclerostomes* produce a devastating effect on horses; the animals lose condition, become hide-bound, and show signs of intestinal disturbance by attacks of colic and diarrhoea. Young animals do not thrive, and at times the mortality in foals due to these parasites is fairly high.

The red or blood worms are from $\frac{3}{4}$ to $1\frac{1}{2}$ inches long, bright red in colour, and are found attached to the wall of the large intestine by their large cup-like mouths.

Tapeworms.

Tapeworms are rarely found in horses, and even when present in numbers, the effect on the animal seems to be slight. They are

mostly found in the intestine, seldom in the stomach. They have been known to cause death from peritonitis, as the result of rupture of the bowel wall, but such cases are extremely rare.

Prevention.

As a preventive measure against infestation by internal parasites, it is essential to avoid overstocking. The more animals there are, the more parasitic eggs are produced, which may cause a re-infestation.

To destroy eggs and larvae on pastures the easiest method is to adopt rotational grazing. Cattle and sheep are immune to the common horse parasites, and if they swallow the eggs or larvae these are digested and destroyed. It will be seen, therefore, that if horses or sheep and cattle are grazed alternately the parasites of both can be kept at a minimum.

Burning off pastures, where practicable, is of great help in destroying eggs and larvae. When dealing with heavily contaminated pastures it may be necessary to plough and lime, and then allow it to lie fallowed.

It is also very necessary to provide an adequate food supply for horses, as poorly-fed animals have a greatly lowered resistance to parasites, and where pasture is short more eggs and larvae are necessarily swallowed.

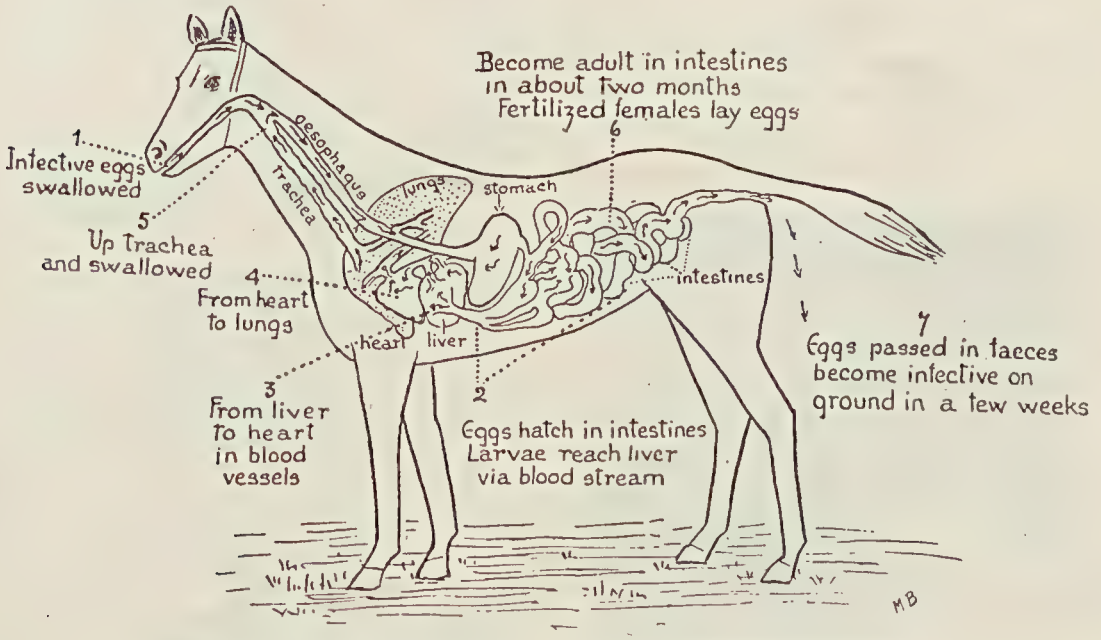
Proper disposal of manure heaps should be arranged in order to prevent excessive breeding of various flies which act as intermediate hosts of certain worms.

Treatment.

No universal worm drench for parasites in horses has yet been discovered, and no particular drug is in any way effective for *all* parasites. Turpentine given in oil is excellent in certain cases, but is quite ineffective in others. Drugs used are oil of chenopodium, carbon disulphide, carbon tetrachloride, etc., and all give good results with certain types of parasites, but are quite useless against others.

To treat horses effectively for parasitic invasion it is advisable to take or forward a sample of faeces to the Director of the Veterinary Research Institute, Story-street, Parkville, N.2, who will diagnose the species of worm eggs present, if any, and will then be able to advise the proper corrective treatment to be adopted.

For general purposes the following treatment is suggested:—The horse or horses suspected of worm infestation should be given three small bran mashes for the first day, i.e., one in the morning, one at midday, and one in the evening, and nothing else. All food must be with-



Route taken by round worms after the eggs have been ingested by the host.

[*Vet. Record.*

held overnight, and in the morning on an empty stomach give a drench consisting of—

Pure turpentine .. .. 2 oz.
Raw linseed oil (or liquid paraffin) .. .. 1 pint.

The drench should be given slowly, well shaken, and the ingredients should be obtained from a chemist to ensure purity. This can be followed in four hours by a small bran mash, after which the usual diet may be resumed in the evening.

Should this treatment prove ineffective a dose of oil of chenopodium may be given after an interval of fourteen days. The dose of this drug is 4 to 5½ drachms for an average sized horse given in a pint and a half of raw linseed oil which should be followed in two hours by a further dose of 1½ pints of raw linseed oil alone. This treatment is more expensive than turpentine, as each dose will cost between three and four shillings. Great care should be taken in administering the dose, which is definitely dangerous in the presence of constipation, and gastro-intestinal or febrile disturbances.

EXTERNAL PARASITES.

External parasites of equines have been rather prevalent this season, and a few remarks regarding the treatment to be adopted in such cases will be of value to horse-owners.

Lice.

In Australia, three species of lice are commonly found on horses. The most important of these is the blood sucking louse *Haematopinus asini*. The two other species are the biting lice—*Trichodectes pilosus* and *T. parumpilosus*.

A horse badly infested with lice.

The biting lice have short, blunt rounded heads, and are smaller than the sucking louse which has a long pointed head (see illustration). The sucking forms do more damage than the biting lice, and are more difficult to eradicate.

The eggs or nits of the sucking louse are attached firmly to the hair and hatch in two to three weeks, they reach maturity and the females begin laying their eggs in about twelve days. They pass their entire life on a horse, and can live apart from their host for about three days only.

A female blood sucking horse louse.

Spread of infestation is mainly by direct contact, but the parasites may be carried on harness, saddles, blankets, &c.

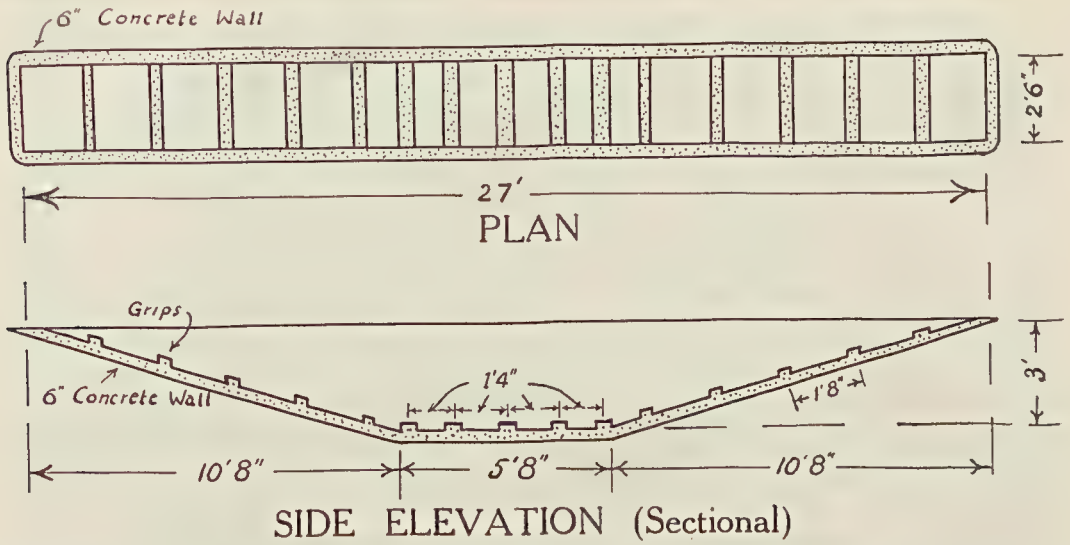
Treatment.

It has been shown by experience that two treatments at an interval of two weeks usually are necessary to eradicate lice. Treatment is easier if the animal can be first clipped, and hand dressings usually are advised except where very large numbers are to be treated.

Dressings found suitable for the purpose are as follows:—

1. *Kerosene emulsion*, which is made by dissolving 1 pound of soft soap in 1 gallon of hot water, and stirring in 1 pint of kerosene as it cools. This preparation is gently worked into the skin.
2. *Sheep dips* of an arsenical nature are useful also, but great care must be exercised to prevent the horse from licking himself and so being poisoned.
3. *Nicotine sulphate* (Black leaf 40), 8 oz. mixed in 1 gallon of soapy water. Scrub this lotion in well with a stiff brush, leave solution on the horse and allow to dry in the sun. Repeat in two to three weeks.

Where many horses are to be treated, however, it will be found necessary to use a dip, as is done in the case of sheep.



Showing the plan and side elevation of a suitable horse dip.

NOTE.—Feet grips on the slopes are 1' 8" between centres, 4" wide and 2" high—tapering to 1". Grips on the bottom are 4" wide and 2" high. All inside edges of grips are rounded.

Foot Mange.

Foot mange is caused by a mange mite, *Chorioptes equi,* which lives on the skin and the lower portions of the legs. Infested horses paw, kick, and rub the legs against fences, &c., and often bite the affected legs. Provided the owner is prepared to clip the affected legs, treatment is easy; any of the dressings for lice mentioned above may be used effectively by immersing the affected limb in a bucket of the lotion.

The *red mite,* so common in poultry (*Dermanyssus gallinae*) is often found on horses, especially when fowls are allowed to roost in stables. The mites drop on the horses at night. Treat by removing the poultry from the stables, and apply any of the dressings just mentioned.

Suitable Horse Dip.

In many centres public horse dips are in use for the treatment of animals suffering from irritation by external parasites on the legs. Some owners have erected horse dips on their properties also. The accompanying diagram, which shows the plan and side elevation of a horse dip erected on a well known stud property, together with the following specifications, should be of use to any one desirous of building a suitable dip.

CONCRETE SPECIFICATIONS.

The mix should be 3½ parts of a clean, well-graded coarse aggregate, either stone screenings or gravel, say, from ½ inch up to 1½ inches in size, two parts of clean sharp sand, graded from "fine" up to the size of a pea, and one part of cement. The water used should be clear and drinkable, carefully measured, and should be in the proportion of about 5½ gallons to the paper bag of cement. Avoid a sloppy mix. A close dense concrete will be obtained by carefully mixing, placing, and ramming the mixture.

The approximate quantities for the dip specified above would be 26 bags of cement, 2 cubic yards of sand, and 3½ cubic yards of screenings or gravel.

METHOD OF MIXING.

Spread the sand required for a batch in a layer about 4 inches deep, then spread the necessary quantity of cement evenly over the sand. Mix thoroughly three times. Again spread out and cover evenly with the screenings or gravel. Mix thoroughly at least two or three times. Form the mixture into a heap and scoop out a hole in the top, sufficiently large to hold the required amount of water for the batch. Pour water into the hole and allow it to soak through the heap, then turn the lot over vigorously three times and use immediately. Mix sufficient only at a time to ensure of its being placed and rammed within the hour. When the job is finished cover with wet bags within a few hours, and keep covered for at least seven days or longer if possible, say, 14 to 21 days.

Tobacco Investigations in Victoria

The Efficacy of Various Fungicides

By W. J. B. McDonald, B.Agr.Sc., Inspector of Agriculture.

The raising of tobacco seedlings under gas, the transport of seedlings from New Zealand, and the presence of stem grub infection in tobacco seed beds were discussed in the May issue of this Journal

The investigations detailed in the following report were conducted at Shepparton by Messrs. M. J. Cannon, B.Agr.Sc., and W. T. Prowd, Tobacco Field Assistant, with the object of gathering information concerning the following aspects:—

(1) Relative fungicidal values of a series of ten spray materials.

(2) The effect of adding a wetter (Agral I) to each of the sprays.

(3) The effect of frequency of application of sprays in the control of mould.

(4) The effect of spray treatments on the growth of seedlings.

The experiment involved the establishment of 264 small seed-bed plots. This number comprised two main groups each containing 132 plots. In Group No. 1 each spray treatment was applied without using any recognized spreader, while in Group 2 all spray treatments were applied with the addition of Agral I—1 in 4,000—as a spreader. Each group was divided into three sections—A, B, and C—and in each section the ten sprayed plots and one untreated control plot were repeated, or replicated, four times. In each group section A was sprayed once per week, section B twice per week, and section C three times per week.

The spray treatments investigated were as follow:—

1. Home-made colloidal copper.—Approximately 0.35 per cent. Cu So4, 0.5 per cent. potash soft soap.
2. Colloidal sulphur (Cosan) 0.4 per cent. and malachite green 1 in 10,000.
3. Bordeaux 2:1:50.
4. Colloidal sulphur (Cosan) 0.1 per cent.
5. Bordeaux 2:1:50 and malachite green 1 in 10,000.
6. Bouisol 0.5 per cent.
7. Colloidal sulphur (Cosan) 0.4 per cent.
8. Shirlan XP 0.5 per cent.
9. Copper emulsion 0.4 per cent. Cu So4, 2 per cent. potash soft soap.
10. Bordeaux 4:2:50.

* On 14th November, Shirlan AG was substituted for Shirlan XP.

All sprays were applied at the rate of 1 gallon of spray to 5 square yards of seed bed.

From an experimental point of view it was unfortunate that conditions last season did not favour severe or early development of mould within the seed bed. In Group 2 of the experiment, that is that part in which all sprays were applied with the addition of Agral I as a wetter no evidence of mould occurred until 11th November, and even then one control plot only was slightly infected. As a result no positive evidence of the value of Agral I as an adjunct to spray treatments was forthcoming. In Group 1, that is where sprays were applied without the addition of Agral I, mould infection eventually became fairly general. It must be pointed out here that Group 1 was separated from Group 2 by a distance of approximately 150 yards. This slight difference in location and soil type may have been responsible for the different degrees of mould infection exhibited by the control plots in the two groups. In both instances the plots were established on areas which in the previous year had produced seedlings infected with mould.

Conduct of the Experiment.

All seed-beds were sown with graded Warne seed at the rate of 1 ounce to 135 square yards. The beds in Group 1 were covered with hessian during the germinating period while those in Group 2 were left uncovered. No obvious differences in the rate or degree of germination was noticed. Spraying commenced 24 days after germination and was carried out by means of a hand bucket pump fitted with a nozzle giving a flat spray. Sprays were applied on the following days:—

Section A.—Once per week—each Friday morning.

Section B.—Twice per week—each Monday and Thursday.

Section C.—Thrice per week—each Monday, Wednesday, and Friday.

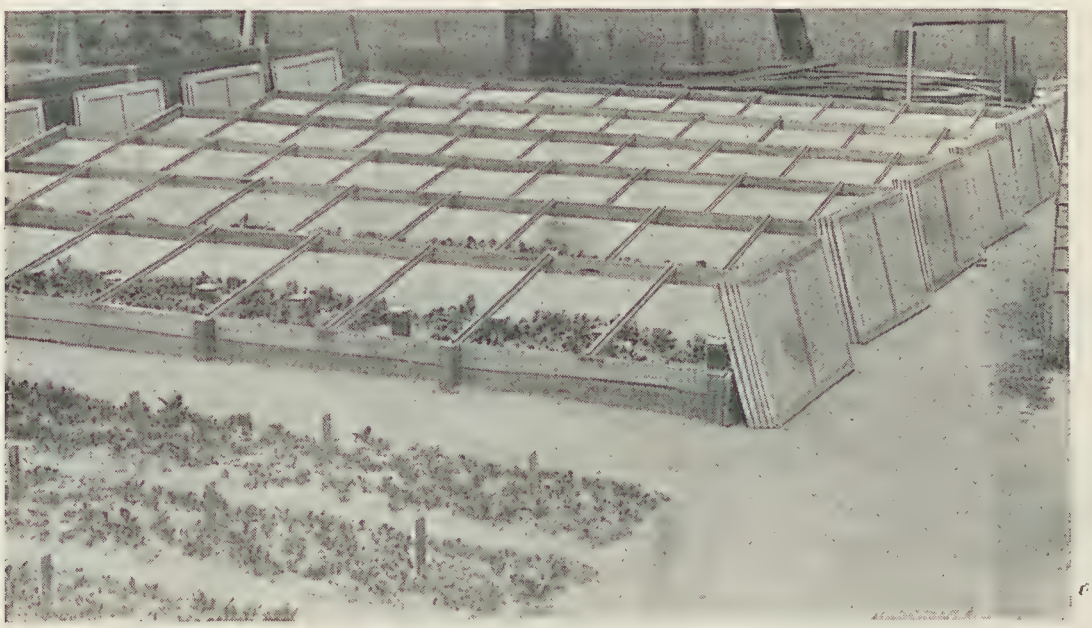


Fig. 6.—Seed frames at Shepparton with spray treated plots in the foreground.

The following table of dates traces the progress of the beds:—

	Group 1 (without Agral I.).	Group 2 (with Agral I.).
Date of Sowing	23.8.35	23.8.35
Germination	16.9.35	16.9.35
Commencement of spray treatment	10.10.35	10.10.35
First appearance of mould	31.10.35	11.11.35
Completion of spray treatment	27.11.35	27.11.35
Transplanting	28.11.35	28.11.35

Effect of Spray Frequency.

As previously pointed out, Group 2 with the exception of one control plot (unsprayed) remained free from mould throughout the season.

Consider only Group 1, which comprises three sections, each containing 44 plots representing four replicates of the eleven treatments under consideration. On 31st October, 18 plots in section A (sprayed once per week) showed mould infection, and on 4th November an additional ten plots in this section also were affected, together with one plot in section B (sprayed twice per week). On 5th November four more plots in section B were infected, together with eight in section C (sprayed thrice per week). By 11th November, eleven out of the twelve control plots in Group 1 were infected with mould. The remaining control plot remained clean throughout the entire progress of the experiment. By 19th November, 42 out of 44 plots in section A exhibited mould, 18 out of 44 in section B, and 14 out of 44 in section C.

It will thus be seen that, while weekly applications of spray have not reduced the degree of infection to any extent, twice weekly and thrice weekly sprayings have exerted a measurable influence in the control of the disease under conditions such as those holding last season. The advantage derived from spraying three times weekly as compared with twice weekly is not particularly marked.

Fungicidal Value of Sprays.

Of the ten sprays tested last season, several gave no measurable degree of protection at all; it seems safe, therefore, to assume that they would be of no practical value in seasons of heavier disease infection. These are Colloidal sulphur, 0.1 per cent.; Colloidal sulphur, 0.4 per cent.; and Colloidal sulphur, 0.4 per cent., plus Malachite green, 1 part in 10,000. Most copper-carrying sprays in the season just past appeared to have about equal fungicidal power, very little mould developing in the beds to which these sprays were applied either twice or three times per week. The spray Shirlan

[*Continued on page 315.*

The Rabbit Pest

Work During the Winter

By J. Matthams, Superintendent Vermin and Noxious Weeds Branch, Lands Department.

DURING the winter months the campaign against the rabbit pest should be continued actively by all landholders.

At the present time particularly attractive prices are being offered for both skins and carcasses and this incentive has led to considerable activity by trappers and ferreters in all districts. In some places, a regular round has been established, rabbits being collected from trappers each day and delivered immediately to the freezing works.

As the prices of skins and carcasses rise, popular belief has it that the rabbits must decrease rapidly as a result of trapping, shooting, ferreting, &c., and many landholders may consider it unnecessary to continue methods of destruction on their own behalf. As soon as the numbers decrease below a satisfactory margin the trapper moves to a more satisfactory site leaving behind sufficient animals to breed freely during the early spring. In addition, although the number of rabbits destroyed by these activities is large, observations have shown that the majority are males. This survival of a larger proportion of females ensures future increases. Breeding, in fact, is renewed with greater activity than during normal conditions.

Landholders are urged, therefore, to supplement this useful work, by continuing the regular methods of destruction, during the winter, which are recommended by the Lands Department. If this procedure is adopted by all concerned the menace can be checked effectively. Further, the chances of being rendered liable to a penalty for non-compliance with the regulations, are considerably reduced.

Methods of Control.

The principal methods of dealing with the rabbit pest during the winter are fumigation, digging-out and strychnine poisoning.

Fumigation.

Very satisfactory results can be obtained by fumigation. The better known fumigants in use are carbon bi-sulphide, commonly called "carbon," and calcium cyanide. In situations where other methods are uneconomical or impracticable, such as rocky country, banks of creeks, or about trunks of trees, fumigation is particularly recommended. Some landholders rely almost solely on fumigation for rabbit extermination. It is found to be a quicker and less expensive method, than digging-out on large holdings.

Care must be taken when inserting the hose connexion into the burrow that the mouth of the burrow is broken down and earth packed tightly round the hose. All openings must then be blocked up and the fumes pumped in. If the operator selects a burrow on the windward side into which the hose is inserted, escaping fumes will not be troublesome.

Digging-out.

The soft earth, during the winter, renders digging-out of burrows a most effective method of control. Thoroughness is the key to success. Before commencing, all rabbits should be hunted to their burrows by means of dogs, and operations should then begin from the boundaries, the work being continued towards the centre of paddocks.

By inspecting burrows again within a few days, any burrow offshoots, which may have been missed, can be dealt with.

Poisoning.

Strychnine poisoning is carried out regularly by some farmers during the winter. The rabbits apparently relish the change of diet offered by apples and carrots. The apples are cut into half-inch cubes and the addition of sugar, makes the bait more attractive. The addition of sugar to carrots is essential. One ounce of poison is used to every 12 to 16 lb. of bait. The poisoned baits are laid from 6 inches to 5 feet apart according to the degree of infestation.

The bait is laid in furrows which run as close as possible to infested spots. To obtain satisfactory results it is essential to provide plenty of free feed on two or three occasions to be followed up by ample poisoned material.

Horticultural Extension Work

By Frank M. Read, M.Agr.Sc., Chief Inspector of Horticulture

SINCE the inception of departmental activity in the fruit-producing industry of Victoria, a very marked change in outlook has manifested itself, not only in the Department, but also in the industry. In the early days the main duties of departmental officers had to do with inspectional work necessary for the enforcement of those Acts of Parliament which controlled the conduct of the fruit industry in this State. Although inspectional or regulatory work is still an important activity, it has been overshadowed in importance during more recent years by the instructional and research services rendered.

Growers gathering for a field day at Pakenham.
[Fruit World block

It is probable that this development has been mainly responsible for the marked and continuous improvement in the relationship between the Department and the industry. It is safe to say that at no time has the position been more satisfactory than at present.

It is not the purpose of this article to bring forward certain matters in any spirit of complaint, nor is it desired to recline in satisfaction viewing the progress that has been made. The truth is that, happy as the present position may be, there is considerable room for improvement before it can be said that every fruit grower in Victoria is obtaining the maximum of service at present offered to him by the Department of Agriculture.

In every fruit-producing district of Victoria, the Department is in contact with the leading and most progressive growers, and is able to offer them from time to time some measure of assistance. On the other hand, it is of course obvious that a great deal of the information possessed by officers is gained by this valuable contact with experienced growers. We are confronted with the paradox, however, that those growers who really require assistance the least are the most ready to accept it, and the difficulty is always to establish contact with the man whose methods give most opportunity for improvement.

It may be said that this reflects upon the working of a Department whose duty it is to establish personal contact with every grower in Victoria. This view, although it absolves growers from any responsibility in the matter, is not really tenable, for the adequacy of the staff available for this work must be taken into account. It is because of necessary limitations in this direction that it is hoped to make clear to the industry the necessity for organization on its part if the work of the Department is to be reasonably effective under existing conditions.

Those of us interested in the fruit industry of this State must realize that the horticultural division of the Department of Agriculture is very largely a social service granted to fruit producers by the people of Victoria as a

Pruning demonstrations have formed an important part of field days held in recent years. [Fruit World block

whole, and it is to them that requests for further consideration properly should be addressed. Growers do not always understand that the Department clearly is not able to decide such questions, though it may be expected to offer a technical opinion when called upon to do so.

Information on fruit subjects is disseminated by the Department in three ways. The first is by personal contact through orchard supervisors permanently stationed in the fruit districts throughout the State. This is the most valuable method, for there can be nothing better than a heart-to-heart talk between the supervisor and grower on the latter's own orchard. The difficulty here is that it would be humanly impossible for the orchard supervisor to visit each orchard as often as is desirable.

In the district of greatest acreage, for instance, there are over 900 growers and more than 50 nurseries under the supervision of one man. It will be apparent that in such a case his visits to each property must of necessity be relatively infrequent, for it is not to be expected that he can weigh the grower's problems accurately in a few minutes.

In the districts of smaller acreage the distances to be travelled usually are correspondingly greater, so that the final result is much the same. Further, it may be remembered that, in addition to being an instructor, the supervisor is also an inspector administering the Vegetation and Vine Diseases Act, the Fruit Act, the Commerce Act, &c., in his district, a phase of his work which takes up a considerable part of his time.

Growers are advised to keep the address of their local supervisor by them, and write to him when desiring advice. He may be able to call; if not, he will write in reply. Many growers who write to the departmental headquarters in Melbourne for information fail to appreciate the fact that they would get their best information from the local orchard supervisor. They may rest assured that if he feels that the assistance of a member of the specialist staff is necessary, he will quickly obtain it. When growers do not know the address of their supervisor, they are, of course, welcome to write to the central office.

The second method of instruction is through lectures, demonstrations, and field days conducted in co-operation by the supervisors.

An interested group of growers at Harcourt following a demonstration of methods of re-working. [Fruit World block

officers from Melbourne, and growers' associations. The initiative in such cases usually is taken by the growers themselves. This method, compared with the former one, has the disadvantage that it cannot fully get down to the problems of the individual, but tends to throw the emphasis on those aspects of fruit growing which are district-wide in their application. It has the great advantage, however, that if attendances are good a great deal can be done in one day. Further, successful field days help to engender that corporate spirit without which a district or an industry cannot really make progress. An instance of civic advantages which may follow organization quite apart from improvement in methods of fruit culture is to be seen at Shepparton, where a strong growers' organization, by actively supporting the local council, has been able to effect great improvements in the minor roads of the municipality.

A typical fruit-packing class showing examples of the work done and trophies gained during the year. [Fruit World block

The great increase in the number of field days in the last few years is a pleasing feature; but there is room for advance in districts which so far have not benefited. Usually held in late winter or spring, field days consist of gatherings of sometimes over 200 growers, at which pruning, grafting, re-working, and other demonstrations have been given, lectures delivered, and discussions held on matters of topical interest. These field days originated in the better-organized districts, but quite recently there has been a marked tendency for them to spread to other districts. The opinion is offered that to maintain interest in the outdoor activities of these field days the competitive element should be further introduced. Competitions, in which the younger growers and the sons of growers may take a more prominent part than at present, will do much to popularize the field days, and it will teach growers to crystallize their ideas, a direction in which the average human mind tends to be lacking.

A phase of this horticultural instruction of which the Department has cause to be proud has to do with packing and preparation of fruit for market. In the last ten years the improvement in the technique of packing and the standard of equipment in packing sheds has been outstanding. Much of this improvement can be traced to the organized course of instruction given to school children in many fruit-growing centres. The child is indeed the father of the man, and where we have found it difficult to alter the methods of some adults it has always been possible to teach children to become skilful packers. These classes have opened a skilled and reasonably lucrative trade to many of them, and past scholars are unquestionably the backbone of Victoria's fruit packing to-day. This work is proceeding apace, and at the last Royal Show the packing competition for children attracted over 200 entries. The competitive element skilfully introduced has been very largely responsible for the interest manifested.

The most important new development this season has been the establishment of a number of plots on apple and pear orchards in the Mornington Peninsula, Metropolitan, Gippsland, and Harcourt districts, in which, on a commercial scale, the recommended methods for controlling codling moth and black spot have been applied for demonstration purposes under departmental supervision. The results so far are encouraging even beyond our expectations, and support the view that the serious losses from these two diseases can be enormously reduced, given reasonable efficiency

[*Continued on page* 301.

Wheat Growers' Relief

Claims Being Considered

FORMS on which wheat growers in Victoria may claim relief under the *Wheat Growers' Relief Act* 1936 have been distributed to Post Offices throughout the wheat growing areas of the State. The forms are available also at the office of the Wheat Growers' Relief Committee at 605 Flinders-street, Melbourne, C.3.

Victoria's share of the Commonwealth Grant is £441,948, and of this approximately £200,000 has been set aside for payment of 1s. 8d. per acre on all wheat sown for grain in 1935. This payment was commenced on the 15th May and claims will be dealt with as soon as they are received from the Inspectors of Land Settlement. This will be followed by the disbursement of £50,000 among those growers who suffered losses in the sowing of wheat crops for grain through drought, hail, storm, or flood damage. The balance of approximately £190,000 will then be distributed as a rebate on freight or transportation costs.

A claimant for the 1s. 8d. per acre should supply all the particulars required on the brown claim form. Any grower who suffered losses to his wheat crop through drought, hail, storm, or flood may, in addition, claim special relief on the green form. The rebate on freight or transportation costs will be paid at a uniform rate, and may be claimed by all wheat growers whose wheat of the 1935–36 season is sold or delivered for sale on or before 31st October, 1936. For this claim the yellow form should be used.

Each party to a share-farming agreement should apply separately for payment on his portion of the crop. A share farmer is eligible to claim only if he has contributed towards the sowing of the wheat by the provision of land, labour, material, or plant. As it is essential that claims from eligible parties under a share-farming agreement be checked before payment thereon can be made, it is advisable for a share-farmer to request the other party to the agreement to lodge his claim promptly. This will ensure early payment.

A claimant should fill in the form or forms in ink, and have his signature witnessed on each form by a Justice of the Peace or a Commissioner for taking Declarations and Affidavits. In the cases of the acreage and special relief claims, the completed forms should be sent immediately to the Inspector of Land Settlement for the district. A list of the names of the towns at which Inspectors are stationed appears on the back of each claim form. For freight rebate, a separate claim should be made on the wheat sent to each buyer or receiver, to whom the completed form should be sent for certificate immediately the wheat is sold or delivered.

In order to facilitate payments and to obviate unnecessary correspondence and delay, each claimant is urged to read carefully the marginal and foot notes on the claim forms, and to take all possible care in their preparation.

ACKNOWLEDGMENT OF RECEIPT OF TELEGRAMS.

IT is often desirable that the sender of a telegram should know with certainty that the message has been received by the addressee. To provide for this contingency the Postmaster-General's Department offers a special facility to its patrons. When this service is desired the address of a telegram should be prefaced by the words "Notification delivery" or "Postal notification delivery," dependent on whether the advice intimating completion of delivery is required to be forwarded by telegraph or by post.

If it is imperative that receipt should be acknowledged immediately, the charge for a telegraphic reply is included in the charges paid for the original telegram. If, however, the factor of urgency is not of paramount importance, the advice can be forwarded through the usual postal channels, when the additional fee is only one penny.

When it is desired to ensure that receipt of a telegram is admitted by the recipient, the "Notification delivery" service is convenient, effective, and economical.

Anthrax

By S. A. Mountjoy, L.V.Sc. Veterinary Officer.

ANTHRAX is an acute infectious disease of man and animals. Among the domesticated animals, cattle, sheep, and horses are most susceptible. The disease is one which is more prevalent in agricultural countries, and is frequently confined to certain localities (so-called Anthrax districts), especially on damp, marshy, or periodically-flooded land. In such localities the disease may occur periodically in the summer time amongst animals at pasture. In man most cases occur amongst persons who come in contact with animals affected with the disease, such as those engaged in tanneries, wool-sheds, and slaughter-yards. Some cases have occurred through the use of shaving brushes made from the bristles of pigs that have died of Anthrax. As a rule Anthrax in man is a local affection of the skin and underlying tissues, and is commonly called "malignant pustule." Fortunately, if suitable surgical treatment is available, the disease is rarely fatal; but, if neglected, death may occur from septicaemia.

Cause.—The cause of the disease is the *Bacillus anthracis*, an organism which needs free oxygen for its growth. It multiplies rapidly, and in the course of a few hours from the entry into the blood of the first bacillus, millions are found in the blood stream.

When an anthrax carcass is opened or blood escapes from the natural openings of the body, the bacilli develop spores which are most difficult to destroy, and can remain alive in the soil for years. These spores are responsible for the spread of Anthrax. When eaten by animals the spores pass to the blood stream, where they form bacilli, which multiply rapidly. Spores never develop in the tissue fluids of the living animal, or in the unopened carcass.

Method of Spread.—The infective organism thrives best in marshy soil or in parts subject to periodical flooding. In these places, after the surface water has receded and the soil is exposed, the spores, in the presence of favorable temperature and moisture, germinate and form bacilli which then multiply.

The disease is seen more frequently in warm weather, particularly after a rainy period. Surface water may carry the spores and cause contamination of water-holes or pastures. Wind also may carry the spores, thus spreading infection.

Soil contamination usually occurs as a result of opening carcasses of animals that have died of Anthrax and neglecting to burn them completely. Apart from the risk of spreading the infection to other animals, the man using the knife is himself running a great risk of becoming infected. Dogs and birds having access to a carcass may carry parts of it away and infect clean ground. Even burying deeply is not a safe method of preventing contamination of the soil, as rising water or earth worms may convey the spores to the surface.

Anthrax is liable to occur at any season of the year amongst animals grazing on infected lands. Infection of horses, cattle and sheep usually takes place through ingestion of food and water contaminated with Anthrax spores.

Young animals in good condition are more susceptible than older animals in low condition. Pigs, dogs and cats are much less susceptible, and usually contract the disease only after eating anthrax carcasses.

Symptoms.—As a rule, particularly at the beginning of an outbreak, no symptoms are shown. The first intimation that anything is wrong is that the animal is found dead, greatly swollen, and with dark-red blood coming from the body openings. Stiffening after death is incomplete. In many cases where symptoms are shown they are rarely characteristic enough to enable the complaint to be diagnosed. Very acute cases may show symptoms of apoplexy. The animal suddenly goes down and remains on the ground in convulsions. Bloody foam issues from the mouth and nose, and blood comes from the anus. Death occurs in from a few minutes to an hour.

In acute and sub-acute cases, there is usually a high temperature which drops quickly before death. Some cases show restlessness and excitement, which later on changes to depression; but in most cases the animal is depressed throughout. Breathing is laboured and the membranes of the eyes, mouth, and nostrils are dark-bluish red. Digestive disturbances may be

noticed. Horses may have severe colicky pains. At first, there is constipation, but diarrhoea soon follows and, particularly in cattle, the droppings are fluid and often mixed with blood. Sometimes large amounts of blood may be passed.

Milk secretion usually ceases soon after the onset of the disease, and if there is any secretion it is usually yellowish or bloody in appearance.

In horses, and more rarely, cattle, hot doughy swellings may appear on any part of the body, but particularly on the neck, breast, flank and loins. Horses may have a severe pharyngitis, with a bloody discharge from the nostrils. Pigs usually have a severe pharyngitis, with swelling in the throat region.

Diagnosis.—For a correct diagnosis a microscopical examination of the blood from a dead animal must be made, and this should be done as soon as possible after death.

As Anthrax is a notifiable disease in Victoria, suspicious cases should be at once reported to the stock inspector for the district. If unable to get in touch with him at once, an ear should be cut off well down at the base, put in a tin, and sealed. The tin should be labelled "Suspicious of Anthrax," well padded with some absorbent material, and placed in a small box and forwarded by registered post to the Director, Veterinary Research Institute, Story-street, Parkville, N.2. The Director should be notified by wire of the despatch of the specimen.

Prevention and Control.

In the case of an animal known to have died of Anthrax, in no circumstances should the carcass be opened. If possible it should be completely burned where it lies, and anything contaminated by it burned also.

Where this is not practicable the carcass should be burned in a hole 6 feet deep and covered with unslaked lime, and any contaminated material such as the earth on which it was lying removed to a depth of several inches and buried with it. In cases where the carcass has to be removed for burial it should be taken to an out-of-the-way place and the burial ground fenced off.

Remaining healthy stock should be moved to another paddock, preferably on higher ground. Investigation should be made as to the possible source of infection, whether by water, fodder, or an improperly burned carcass, and precautions taken to prevent further outbreaks. All contacts should be inoculated with a reliable vaccine. As a precautionary measure stock on anthrax areas should be vaccinated every year.

The Addressing of Mail Matter

THE postal authorities have asked that the attention of readers be directed to the necessity for correctly and fully addressing all articles of mail matter. An examination of the letter delivery service has revealed an astonishing lack of care in the addressing of postal articles, and, notwithstanding every effort by the Department to minimize the effect, delay or failure in delivery must result from faulty addresses.

The Department's aim is to have the following particulars included in each address, with the information set out in the order indicated:—

1. Title (Mr., Mrs., Miss, &c.), first name or initials, and surname of the addressee.
2. Name of house (if known).
3. Number of house and name of street.
4. Name of post town and, in Melbourne city and suburban addresses, the postal district number.
5. Name of State or country of destination.

Mail matter for private box-holders should be addressed to the private box number instead of the street address.

Bee Mortality in the Orchard

The Effect of Arsenical Sprays

By J. S. Eagland, Apiary Inspector.

IT has long been recognized that for those varieties of fruits which require to be fertilized with pollen from some other variety, the honey bee plays the very useful role of pollen carrier. Bees require pollen and nectar for their subsistence, and in gathering these, they transfer on to the sticky stigma of the flower the pollen adhering to hairs on their bodies, which was obtained from other blossoms, and so fertilization is effected. As the individual bee has a marked inclination to gather its food from only one type of blossom and in one locality at a time, it has been found necessary in practice to plant cross fertilizing varieties within reasonable distance of one another.

As a result of the acceptance of the general fact that bees indirectly assist in the setting of a crop of fruit, some orchardists maintain their own hives, while others hire hives of bees from apiarists, and these are placed in the orchards during the blossoming period of the fruit.

Very little work with bees in orchards has been done on a large scale in Victoria, but they have been used extensively in the United States of America where the practice has developed of hiring bees at prices varying from two to four dollars per colony. It is reported that this practice has met with great success overseas.

The presence of hives of bees among the trees may be a danger to many orchardists during cultivating and picking operations. In such cases the placing of bees in the orchard for the short blooming period only, should be advantageous.

A bee laden with pollen returning to the hive. [After Casteel.

Dead bees collected from the front of one hive in one day, after return to the home apiary.

To secure the best results the colonies used must be numerically strong in bees of field age. Many colonies owned by orchardists are actually at their weakest in field bees, at the beginning of fruit bloom, although there may be many young ones present; and these make a good show of bees flying round the entrance to the hive. A large field force is desirable during

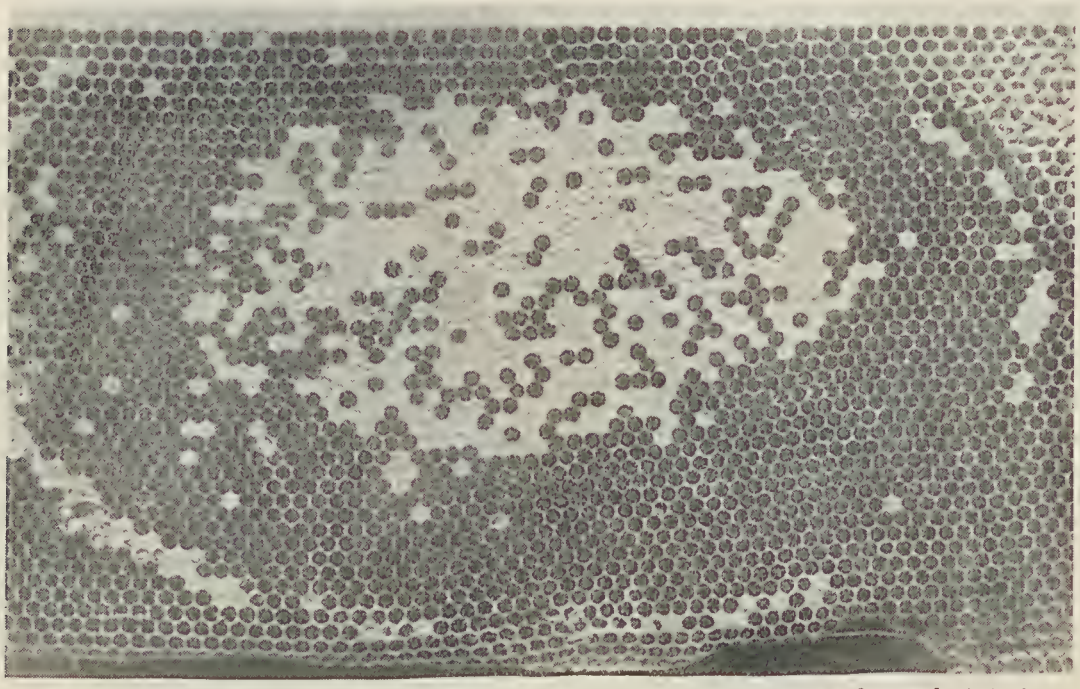
late September and October, and to accomplish this the bees must be breeding heavily during the latter half of August. This condition usually can be achieved only by skilful management and a favorable location for the apiary.

During recent years there has been a marked depletion in the number of bees operating in Victorian orchards. This was particularly noticeable during last spring in the Somerville and Tyabb districts. Accordingly arrangements were made by several growers from these districts, with an apiarist, to distribute 50 hives in various orchards. Subsequently an interesting case occurred of what apparently was arsenical poisoning of bees from the use of arsenate of lead sprays for codling moth control of apples and pears. Spraying with lead arsenate commenced, in some adjoining orchards, twelve days before the bees were removed, and it was noticed, by the apiarist, that the strength of the colonies had been greatly reduced. Further observations revealed unusual numbers of dead bees on the ground in front of the hives, and a large number of dead larvae in the brood combs. The author later inspected the hives on return to the home apiary when numbers of dead bees were in evidence in front of all hives although the bees had been located in their position one day only. Examination of the brood nests revealed dead larvae in all cases, in fact, almost the whole of the brood, over a period of ten to twelve days, was dead or missing. This represented nearly half of the total brood of the colonies.

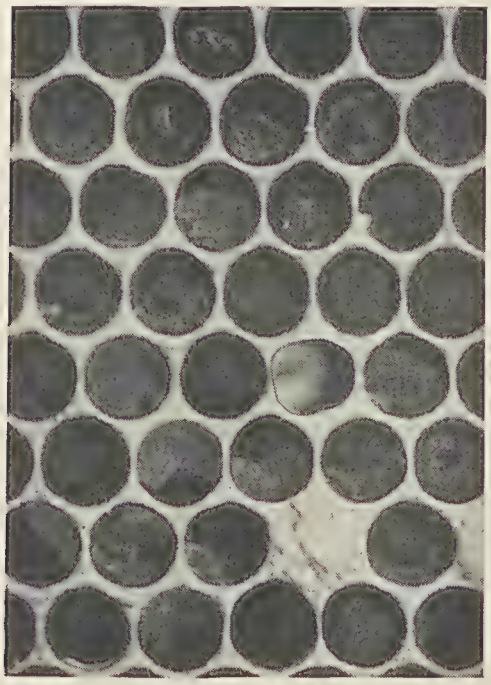
As no evidence was obtained suggestive of any known bee disease, samples of dead bees, larvæ, pollen, and honey from the hives, referred to above, were submitted to the Agricultural Research Chemist for analysis. The result of the analysis is shown in the accompanying table.

—	Arsenic (As_2O_3) Per 100 Grams.	Arsenic (As_2O_3) as Grains Per Lb.
Dead bees ..	0·43 milligrams or 0·00043%	0·030
Dead larvae (dried)	0·66 milligrams or 0·00066%	0·046
Pollen	1·00 milligrams or 0·001%	0·070
Honey	0·12 milligrams or 0·00012%	0·0084

The Research Chemist's report states also that while the honey contains a small amount of arsenic the pollen contains ten times this amount.



Typical comb from broodnest showing blank spaces in brood area where larvae had died.



Enlarged section of brood comb showing dead larvae in base of cells.

Samples of bees and honey from healthy hives were analysed also and were found to be free of any trace of arsenic.

Arsenical poisoning of bees has been studied very carefully overseas, and work by McIndoo and Demuth, Bulletin 1364, United States Department of Agriculture, has shown the minimum fatal dosage of arsenic (as metallic arsenic) to be about 0·0004 to 0·0005 milligrams per bee. These authors also put forth much experimental evidence to show that spraying fruit trees in full bloom, under certain conditions, is very injurious to bees.

There seems to be little doubt that the mortality in the bees at Somerville and Tyabb was due to arsenical poisoning. A probable result of the heavy proportion of arsenic found in the pollen stored in the combs, would be a recurring number of deaths of bees and larvæ until such time as the pollen was consumed. Loss by an apiarist may therefore extend over a considerable period. A check of the production of the affected hives, compared with an equal number of normal ones belonging to the apiarist in question, indicated that the loss for the season was about £20.

Many apiarists would at once blame the orchardists for the loss, assuming that trees had been sprayed while in bloom, but this is not necessarily so, although there may be some bloom left in the case of a variety having a very extended blooming period. Contaminated pollen may be picked up from spray which has drifted on to late blooming trees adjoining those sprayed at the correct time. In addition, ground flora, such as cape weed in bloom, under and between trees, may catch portion of the spray as it falls and be a source of danger to bees. This could be avoided to a great extent by careful management in orchard work.

The result of the analysis appears to offer an explanation of the oft repeated reports from orchardists, that they could not keep bees alive in their orchards for more than a year or two.

Horticultural Extension Work (*Continued from page 295*)

in spray equipment and its use. Growers are invited to take a close interest in the progress of these experiments, which are going to play an important part in the future, and will be extended to other districts where staff permits.

The third method of instruction is through the pages of departmental publications. The *Journal of Agriculture,* which is posted monthly to readers for the nominal charge of 3s. per year, should undoubtedly be on the book shelves of every fruit grower in the State. Scarcely a day passes without a request reaching the Department for advice on a subject recently dealt with in the *Journal.*

Butter Production and Export

The following tables show :—

(*a*) Factory production of butter and cheese in Victoria for the period July 1935, to January 1936, and for the months of February and March, 1936, compared with the corresponding periods of 1934 and 1935 ; and

(*b*) Quantities and percentages of various grades of bulk butter examined in Victoria from 1st July, 1935, to 2nd May, 1936, in comparison with the corresponding period of 1934–35.

(*a*) Factory Production of Butter and Cheese in Victoria (Quantities in Tons).

Month.	Butter.		Cheese.	
	1935–36.	1934–35.	1935–36.	1934–35.
July to January (inclusive)	48,134	44,073	3,533	2,930
February	4,624†	5,105	326†	352
March	3,530†	4,401	252†	307
Totals, nine months ..	56,288	53,579	4,111	3,589

† Subject to revision.

(*b*) Bulk Butter Examined for Export in Victoria (Quantities in Tons).

Period.	1935–36. How Graded—				Total.	Period.	1934–35. How Graded—				Total.
	Choice.	1st.	2nd.	Pastry.			Choice.	1st.	2nd.	Pastry.	
1st July to 28th March ..	22,176	11,469	2,707	398	36,750	1st July to 30th March ..	14,619	16,782	2,986	450	34,837
29th March to 2nd May	92	154	88	21	355	31st March to 4th May ..	1,063	816	221	33	2,133
Totals 1st July to 2nd May ..	22,268	11,623	2,795	419	37,105	Totals 1st July to 4th May ...	15,682	17,598	3,207	483	36,970
Percentages ..	60·0	31·4	7·5	1·1	..	Percentages ..	42·4	47·6	8·7	1·3	..

Phylloxera-Resistant Vine Stocks (V.)

Considerations Governing the Choice of a Stock

By F. de Castella, Viticulturist

ON the judicious selection of the stock the success of the grafted vineyard absolutely depends. Such vital aspects as yield, quality, and longevity are intimately bound up with the proper suiting of the stock to the conditions under which it will have to grow and to the scion with which it will be grafted.

It follows that the establishment of a vineyard, to-day, is not nearly so simple a matter as it was before Phylloxera. In those fortunate times, due regard had, of course, to be paid to the vine sort—early or late according to climate, choice or common according to the trade to be catered for. It is curious that the rather sparing yield of choice grapes on poor land may prove as remunerative as commoner wine produced in far greater abundance, from more plebeian sorts, on soils sufficiently fertile, In old wine countries, where there is a premium for quality, too little in evidence here, a yield of 200 gallons per acre of very choice wine may pay quite as well as 1,500 gallons of "Vin ordinaire".

The only problem, however, was the vine that yielded the fruit. It was grown ungrafted, or on its own roots, and the complication of the stock did not present itself. Vitis Vinifera, the wine bearing grape, to which species all European vines belong, is remarkably adaptable, thriving in a wide range of climates and soils. The American vine is not so accommodating: the several distinct species, coming, as they do, from different regions of the North American Continent, are each suited by a narrower set of conditions. The American vine is far harder to please in the matter of its environment than were the old vines of Europe.

The number of good vine stocks being now considerable the intending planter has a wide choice; he is fortunate in that stocks are available, suited to every set of climatic and soil conditions under which ungrafted viniferas were formerly grown, but the selection of the right stock for any given case is a matter of considerable delicacy. Unfortunately there is no universal or "good all-round" vine stock, such as orchardists have long considered the Northern Spy to be, for their apples. The stock that is admirable in one vineyard may prove quite unsatisfactory in another, not far distant. To plant Riparia stock on poor land, or Rupestris on that which is too rich, would be equally disappointing, and there are several other aspects, as will be seen below. For each set of conditions, one stock, or at most a limited number, will prove far superior to the rest, and it behoves the intending planter to ascertain which is this eligible stock (or stocks) for his special case. Upon the discrimination shown depends the fate of the future vineyard—whether it is to be an unqualified success, moderately satisfactory, or altogether disappointing, for every degree between the first and last is possible.

Some vineyards, grafted on resistant stocks, are emphatically in the first category; neither as regards yield nor quality do they leave anything to be desired; in both respects results are at least equal to those from the same grape, grown ungrafted, on that vineyard site. Such a happy result is not the invariable rule, and there are admittedly cases where the vineyard on resistant stock is less satisfactory than one planted with ungrafted vines. In such, the fault invariably lies in the injudicious selection of the stock.

Too frequently, growers are satisfied with a stock that gives fair growth and yield. The quest for something better is not pursued as it should be. This neglect is mainly to blame in cases when the results of the grafted vineyards fall short of those from vines "on their own roots." The important bearing that a seemingly slight advantage may have on financial results is not duly recognized.

The quality of the wine yielded by reconstituted vineyards is not infrequently arraigned by acknowledged connoisseurs, who are prone to assert that, since Phylloxera, the choicest growths of France fail to reach their former standard of excellence—that there are fewer "great vintages," and that these do not equal the celebrated ones of the pre-phylloxera period.

For this the resistant stock is unreservedly blamed. Similar complaints are seldom heard concerning cheaper wines. The improvement in their quality, due to modern oenology, quite eclipses any defects the stock might be responsible for. The real merits of the case are difficult to correctly appraise, for the question is very complex. An unbiased observer must admit that wines of extraordinary quality are still being produced by the privileged "Grands Crus" from vines on resistant stock. Their comparison with wines made half a century earlier, which are largely memories to-day, is most difficult. Allowance must be made for the greater age of these wines and for the prejudice that always arises against a new order of things, more especially in connexion with a "de luxe" product such as wine of the very highest order—also for the glamour attaching to bygone days. The apples of to-day do not compare with those of our boyhood!

No change in the flavour of the grape results from its being nourished by American roots. The exaggerated views of Daniel on specific variation have long since been refuted, yet the stock undoubtedly plays its part: some have a definitely ameliorative influence on quality, whilst others have an opposite tendency.

Even admitting some reduction in the quality of the choicest French wines since reconstitution, and it is by no means proved, it is due in far greater measure to Downy Mildew than to any shortcomings of the resistant stock. This disease found its way to France in the late seventies, since when, in seasons suited to fungous development and in spite of energetic control measures, it has been detrimental to yield and especially to quality.

Nor must some other factors be lost sight of. The stocks first used were inferior to those available to-day, especially as regards their influence on quality. The wines from the reconstituted vineyards were the produce of young vines, and such is invariably of lesser quality than that yielded by older ones. Hence the prejudice that has long existed and still lingers against the resistant stock.

The influence of the stock on the quality of the wine will be further discussed below. It will suffice to state, at this stage, that though the shortcomings with which the new vineyards are charged may often be more imaginary than real, there are cases in which criticism is well founded. In such, the choice of the stock is invariably at fault. If this be selected with due regard to every aspect of the case, neither yield nor quality will be inferior to that of the same scion sort if grown on its own roots.

The choice of the best stock is by no means easy. Methodical testing over a series of years is, of course, the safest guide. Public opinion, though useful, is not altogether reliable. The popularity of a stock is liable to fluctuations, depending on a variety of circumstances. It may be due to advertising by the raiser or by interested nurserymen. The latter naturally favour vines that are easy to propagate and yield stout cuttings in abundance. They may neglect stocks that are really superior in several more important directions. Apart from such interested motives, other considerations may influence popularity. After a series of dry years, drought resistance is in demand. After several wet springs the setting of the blossom may appear more important.

A case of fluctuating popularity in the French Cognac district is of interest. In the late nineties the most popular stock was No. 1202, which throve in the chalky soils of the region. It was, however, soon surpassed in public favour by No. 41B, which is even more lime tolerant and renders the scion more fruitful. No. 1202 sometimes tends to excessive growth at the expense of yield. Ten years later, however, public favour was reverting to No. 1202, several growers having found that, though somewhat "shy" at first, this stock became more fruitful with age, in some cases even beating No. 41B. The explanation is interesting; the declining yield of No. 41B was not the fault of this stock but the indirect result of one of its chief merits, viz., its heavy yield. The more fruitful vine being naturally more exacting as regards soil plant food, it hastened the time when restitution, in the form of manure, became necessary. Heavy manuring not being the rule in Cognac, a time had arrived when No. 1202, which had taken less out of the soil, seemed to have the advantage over its somewhat fatigued rival.

Advocacy of a new and insufficiently tried stock demands courage, or, shall we say, recklessness. Those concerned with the propagation and sale of vines prudently adhere mainly to those of proved value. They refrain from the chances of hitting on something better, promising though the trail may seem. In the quest for the ideal stock there is risk of being led to follow Will o' the Wisps, that lead only to disappointment. The high road of reconstitution is strewn with corpses in the shape of discredited stocks, for which bright futures were predicted by those qualified to speak with

A heavy yielding vine—Alicante—Bouschet grafted on Rupestris du Lot.

authority. Few indeed are those that have made good.

And, yet, progress demands that we try out the newer stocks, some of which are doubtless destined to supplant present-day favorites, each for its own special environment. In the quest for the best stock every aspect of the case demands careful consideration. Foremost among these are proper adaptation of the stock to climate and soil, and thorough affinity between it and the scion sort to be grafted on to it. Of equal importance with these are such questions as Phylloxera resistance and the influence of the stock on vegetative vigour, on yield and on quality.

Phylloxera Resistance.

Phylloxera resistance can logically be considered first, for it is the keystone of reconstitution, the *raison d'être* of the American vine. A resistant stock that does not really resist is somewhat of an absurdity, and yet some very popular stocks, e.g., A.R.G.1 and No. 1202, are not of the highest resistance; under certain conditions these have proved inadequate and vines grafted on these stocks have suffered in consequence.

Resistance is, after all, only relative; it is largely a question of soil and climate. A stock that is altogether reliable in a certain locality may be found wanting elsewhere. None of the stocks in use are immune; the insect can live on their roots though it seldom multiplies to any extent; it certainly does not swarm, as on those of the non-resistant Vinifera.

Phylloxera infests either root or leaf. The gall form occurs on the foliage of some highly resistant vines; on such the insect evidently prefers leaf to root. Conversely, leaf galls are very rare on V. Vinifera, whose roots do not resist at all. The gall form presents little practical interest save in the case of some hybrid "direct producers," to which it sometimes causes injury.

On the roots, Phylloxera inflicts lesions of two distinct types. "Nodosities" are small swellings on the terminal roots; they are of little gravity unless very numerous. "Tuberosities" constitute the real danger; these are canker-like sores that affect the more important roots, penetrating deeply, and ultimately severing them. With repeated injury of this nature the early death of the vine is inevitable. It is on the number of tuberosities and their severity that vulnerability to Phylloxera mainly depends. Stocks on which they occur must be regarded as suspect. They should be avoided unless the soil be sandy, or at least deep and moist.

On stocks of the highest resistance, nodosities are rare and tuberosities do not occur; their roots seem to be unpalatable to the insect. On those of lesser though sufficient resistance

nodosities may sometimes be found, but tuberosities are rare and shallow; they soon heal, and no permanent injury results. The occurrence of nodosities, and even a few tuberosities, does not always condemn a stock. Such undoubted resisters as Nos. 101-14 and 3309 are in this case, the roots of the former often bear quite numerous nodosities whilst those of the latter sometimes show tuberosities. They are limited to the small roots and are only superficial (Ravaz).

Resistance varies enormously with the soil: in pure sand all vines resist, even Viniferas. Important vineyards were established on seashore sands near Montpellier (France) when this immunity was proved, in 1872. Previously this land was of very little value. After more than 50 years they are still very productive—with the help of adequate manuring, it is true, for such sands contain little plant food.

How sand protects is not very obvious. It does not similarly inhibit the action of eelworms, which are often troublesome in sandy soil. The early explanation—injury to the insect by the sharp particles is now discredited. The reason seems to be twofold. Sandy soils dry out without shrinking, as clay soils do; spaces are not left, along the roots, where the insects can circulate as the season advances. Sandy soils are more thoroughly permeated by the winter rains, all imprisoned air is driven out, and the insects are drowned. For complete protection a content of about 60 per cent. of pure silicate sand is considered necessary. Calcareous sand does not offer similar protection.

In soil that is only moderately sandy, insufficiently so to permit the survival of Viniferas, a stock of rather low resistance may suffice—as, for example, in the French Beaujolais district (near Burgundy), where the granitic and schistose soils are not unlike those of Rutherglen, and where Phylloxera is not very deadly. Here the almost obsolete *Vialla* stock has long been the favorite and is still in use. This old Labrusca-Riparia hybrid was discarded at an early date in Southern France, where it soon succumbed to the insect.

On stiffer soils Phylloxera is much more to be feared; on dry shallow hillsides it is particularly virulent, especially if the soil be rich in lime, which increases in a marked degree the vulnerability of the vine, seemingly owing to the more abundant soil micro-flora it promotes. It is penetration by soil bacteria, through the punctures made by the insect, that causes the injury to stocks of poor resistance. This aggravating influence of lime was strongly evidenced by the progress of the Phylloxera invasion in France. On calcareous land the vineyards succumbed with startling rapidity; on that of low lime content they lingered, in some cases, for years, especially if of somewhat sandy nature.

Between the extremes of a deep sandy soil and a shallow stiff limey one, every degree of difference is possible. According as the soil tends in either direction so will liability to injury diminish or increase, the need for a highly-resistant stock varying accordingly.

French authorities distinguish between "Phylloxerating" soils and those which are not; a stock which is amply resistant in the latter may be quite inadequate in the former.

Soil moisture exerts a considerable influence in increasing resistance, no doubt owing to rapid root growth repairing the ravages of the insect. In a moist situation a stock may suffice that falls short on a dry site. Very high resistance is, therefore, less essential in irrigated vineyards. Too much reliance must not, however, be placed on this action: it is certainly not sufficient to ensure the survival of Viniferas on their own roots. Though the life of the phylloxerated vine may be prolonged somewhat, it soon reaches an unprofitable condition, demanding replacement. Nothing short of submersion—i.e., flooding once each year for 40 days, without a break, can enable the ungrafted Vinifera to defy Phylloxera except in almost pure sand. Submersion is impracticable in most of our irrigation areas, as it would aggravate seepage troubles that are sufficiently acute without it.

The influence of climate is also important. In warm regions, with long growing period and short winter rest, the activity of the insect is necessarily greater. A couple of additional generations per year are sometimes possible, as compared with cooler climes, hence complaints of insufficient resistance come chiefly from warm regions; a fact that it would be unwise to overlook in Australia.

Affinity also plays its part; if this be satisfactory, and the scion a strong grower, the union will result in a big vine with root system developing in proportion. Big vines fear Phylloxera less than smaller ones, as witness the survival of large trellises in regions where the smaller vines in the vineyards were soon destroyed. Hence it is that grafting with a European scion usually lessens the resistance of the stock. Thus Jacquez, that was much used as a stock in the nineties, often succumbed

to Phylloxera in the same soil where, grown as a direct producer, it showed much higher resistance.

Depending as it does on so many factors, a specific resistance can scarcely be assigned to each stock, unless perhaps for a soil of a certain definite type. Even so it is difficult to determine, and scarcely admits of arithmetical expression. Absence of outward symptom of Phylloxera injury does not necessarily prove resistance. As pointed out by Ravaz (Vignes Americaines), when a vine succumbs to Phylloxera it can be classed as non-resistant; so long as it does not suffer, we are in ignorance as to whether it resists or not.

A young vineyard on resistant stock at Rutherglen.

Ingenious methods have been devised and tried. Comparison, side by side with a vine of known resistance, in pots or in the open, artificially phylloxerated with infested root fragments, or gall-bearing leaves, have sometimes proved disappointing. In some pots the insect multiplies; in others, for reasons that are not clear, it fails to do so. Results often indicate receptivity rather than resistance. It is curious that some poor resisters may be free from Phylloxera on the terminal roots though liable to dangerous tuberosities on the larger ones. The seeming dislike, of the insect, has credited such vines with an unmerited degree of resistance. Behaviour of a stock in commercial vineyards, where Phylloxera is known to be present, is no doubt the final court of appeal, but it is slow, uncertain, and often contradictory. Years elapsed before the insufficient resistance of such obsolete stocks as Clinton Taylor and Jacquez was definitely established.

Scales of resistance have nevertheless been drawn up, the best known being that published by Viala and Ravaz in 1896. According to this, absolute immunity is represented by 20 points; most Vinifera sorts are rated at 0, or no resistance at all, though a few are credited with the co-efficient 1.

Though such scales must not be taken too literally, they afford a convenient standard of comparison and are often quoted. Resistance is also defined by stating that that of a given stock is equal or superior to that of Jacquez, Solonis, or some other well-known vine, an estimate that is often qualified by the word "perhaps".

The following table shows the comparison of Viala and Ravaz' scale with that of Foex (1899):—

Scale of Resistance to Phylloxera.

—	Viala and Ravaz.	Foex.
Absolute immunity	20	..
Vitis rotundifolia	19	..
V. riparia (Gloire, &c.)	18	18
V. rupestris (Martin, Ganzin, &c.)	18	18
Riparia x Rupestris, 3309, 3306, and 101–14	..	18
V. cordifolia (various forms)	18	..
V. Arizonica	18	..
V. Monticola	17	..
V. Berlandieri (several)	17	17
Berlandieri x Riparia 34E	..	17
Chasselas x Berlandieri 41B	..	17?
V. aestivalis (wild form)	16	..
Rupestris du Lot	16	18
Cabernet x Berlandieri Np. 333	..	16?
A.R.G. 1 and 2	..	16?
V. cinerea	15	..
V. candicans	15	..
Lincecumii	14	..
Solonis	14	14
Vialla	14	14
Noah	14	..
Taylor	13	13
Jacquez	12	12
York's Madeira and Black July	11	..
Elvira	10	..
Othello	6	..
Alvey	7	..
Isabella and Wild Labruscas	5	..
V. Californica	4	..
Concord (Labrusca)	3	..
V. Cognetiae (Asiatic)	3	..
V. Amurensis (Asiatic)	2	..
Colombeau, Uni blanc, &c. (Vinifera)	1	..
Most other Viniferas	..	..

It will be seen that authorities are not in complete agreement concerning some vines—Rupestris du Lot, for example. Foex awards it 18 points, Viala and Ravaz only 16; and yet du Lot is one of the most popular and trusted stocks. The occasional notes of interrogation on Foex's scale are significant.

It is not clear why V. Rotundifolia should be awarded only 19 points. As Phylloxera has never been seen on its roots, it would seem to merit the full 20 points. Viala and Péchoutre (Ampelographie) credit it with immunity.

According to Viala and Ravaz, 16 to 20 points indicate sufficient resistance for all soils; 14 and 15 are sufficient for sandy and damp soils, where Phylloxera does less harm; 13 and under should be totally discarded from vineyards.

The resistance of the Franco-American hybrids (Vinifera x American) merits special consideration, since some of these, notably A.R.G.1 and No. 1202 are very popular stocks. Many years have elapsed since Viala's warning concerning their insufficient resistance, which is necessarily somewhat reduced by their affiliation with the non-resistant Vinifera.

In their article on Resistant Stocks (Ampelographie, vol. 1, p. 470) Viala and Péchoutre praise the qualities of several Franco-Americans as regards vigour, affinity, lime-tolerance and accommodation to dry, poor, compact soils, as well as to those that are rich and moist. But is their resistance adequate? Even A.R.G.1 and 1202, which seems to possess it in greater measure than other hybrids of this breeding, are far from the absolute resistance of the pure American species and hybrids between these. They cite numerous cases of Phylloxera decline in stiff, shallow, poor soils in the South of France and in Sicily. Concerning No. 1202 they say, "We are nevertheless convinced that its Phylloxera resistance, always doubtful in media very favorable to the insect, should make growers very circumspect concerning the generalization of its use; the Riparia-Berlandieris should be preferred to it in limey soils where it would be seen to be indicated; many other stocks (Americano-Americans, or pure species) offer far more guarantee of resistance, and are of equal value as regards adaptation in non-calcareous soils." They concede a slightly higher resistance to A.R.G.1, notwithstanding occasional failures.

Ravaz expresses similar views in Les Vignes Americaines (1902). The resistance of these hybrids has not proved as high as one might wish. It is intermediate between the two parents; more or less approaching that of Rupestris. Though it may not suffice in all soils, it may do so for those that are deep, cool and sandy. A.R.G.1 often presents many large tuberosities, though the terminal roots are little attacked. Its great vigour permits prompt repair of the damage. There is risk of insufficiency in dry or shallow soil. The powerful roots of No. 1202 can also be attacked with intensity, tuberosities being frequent and penetrating, though terminal roots are largely free. It would be imprudent to plant this stock on shallow, dry soils.

These warnings were seemingly discounted by the marked success of very large vineyard areas, grafted on these stocks, and in practical circles the forebodings of the authorities were looked upon as over cautious. Recent events, nevertheless, have proved them to be only too well founded, and these hitherto favorite stocks are now looked upon with suspicion in certain quarters.

According to a fairly recent report (1928) of Ravaz and Branas, on the stocks in the experimental plots at Montepellier School (France), the Vinifera x Rupestris hybrids are unfortunately rather attacked by Phylloxera, as shown by growth and yield, compared with du Lot under similar conditions. Their somewhat depressed growth during several years past is accentuated in a dry season though less evident in a moist one.

In California these vines are only credited with qualified resistance. Bioletti and Flossfeder (Bulletin 331, University of California Publications, 1921) state that A.R.G.1 is "attractive to Phylloxera, which may weaken it in poor or dry soil"; as regards No. 1202 "Phylloxera attacks it but does little damage in deep, moist soil." No. 93-5 "Like 1202, is attacked by Phylloxera, but is sufficiently vigorous to remain healthy in good soils."

In South Africa, A.R.G.1, which is known there as Aramon No. 1, was for some years a most popular stock, but it is now altogether discredited. Professor Perold (Treatise on Viticulture, 1927) reports numerous failures due to Phylloxera at Helderberg, in the Stellenborch district, where "the soil is sandy, clayey, and in parts sandy with loose clay ironstone gravel and clay in the subsoil. It is a poor soil and becomes rather dry in summer." A soil which would not seem very "phylloxerating" according to Australian experience. "The decline commenced about 1912, and hundreds of acres have been uprooted and replanted with

A vineyard at Kangaroo Ground, dying of Phylloxera.

101-14 and 1202." Perold strongly advises Cape wine growers *"to stop using Aramon as a stock."*

It is curious that, at the Cape, A.R.G.1 should prove definitely less resistant than No. 1202. In France A.R.G.1 is held to be rather the more resistant of the two. Perold states No. 1202 to be "everywhere still sufficiently resistant to Phylloxera although attacked by it. If its grafted vines should suffer from drought or other causes it might be destroyed by Phylloxera. No such case has, however, been observed hitherto at the Cape." He also states that "in moist, sandy soils it is easily killed by eelworms."

In striking contrast with South African experience is the success of both A.R.G.1 and No. 1202 in Australia. Hundreds of acres of vineyards have been reconstituted on these stocks in Rutherglen and other localities in North-East Victoria, in many cases on sites where old vineyards dying of Phylloxera had just been uprooted. Many of these vineyards are over 30 years old, yet in no single instance has any weakening been reported that might suggest Phylloxera injury. These stocks have been planted on every class of soils in which vineyards have been established. Their success on deep, moist soils, often of sandy nature, is not surprising, but even on dry, stony hillsides they are holding their own, in comparison with Nos. 3309, 3306, and others of undoubted resistance. It is true that the Rutherglen and similar soils are not highly "phylloxerating." Their low lime content and often silty nature are not very favorable to the insect. Though the ungrafted Vinifera succumbed rapidly, many stocks of only mediocre resistance on soils where Phylloxera proves virulent, seem to resist sufficiently for practical purposes, in similar manner to the case of the Vialla stock in Beaujolais, referred to above.

Impressed by the importance of the South African failure, the writer sought further information. To test the identity or otherwise of the Cape Aramon No. 1 with our own A.G.R.1, rooted plants of the latter were sent, in 1933, to Mr. C. J. Theron, Head of the Viticultural Department at Stellenbosch University. In a letter dated last December, he states that he planted these vines alongside some Cape Aramon No. 1, in a red hillside loam soil, in which he knew Phylloxera to be present. "They are in their second leaf now" writes Mr. Theron," and as far as I can make out the two are identical in all respects. Already last year they showed signs of Phylloxera, and when I inspected them this morning both were so full of insects, nodosities and tuberosities, that I cannot even think of grafting on to them. If anything, the Australian vines are even worse than our own, but both are absolutely useless . . . . In our own vineyards, Aramon has now disappeared to a very large extent, but thus far we have had no complaints of the other Americo-Vinifera hybrids."

A possible explanation may be found in Borner's view, that there are two distinct races or strains of Phylloxera; a more virulent one, to which he gives the specific name *per-vastatrix,* being injurious to vines that resist the ordinary *vastatrix* race. Perold suggests that "at the Cape a race might have been evolved which has a special fancy for the Aramon roots." If this view be correct the per-vastatrix race would seem to be absent from Victorian vineyards.

Whatever the correct explanation may be, the failure in South Africa and elsewhere of this stock, that still enjoys such popularity and confidence in Victoria, is certainly disconcerting. Warnings from so many sources cannot be disregarded, and except in soils where experience has shown them to resist sufficiently, the Vinifera Americans must be under suspicion. Under irrigation their resistance should suffice in all soils. Fortunately there is a wide range of more resistant stocks to select from, many of which also present marked advantages in other directions.

Orchard and Garden Notes

By Edward E. Pescott, F.L.S.

The Flower Garden.

THE dry season that has been experienced, generally, is causing many garden plants to suffer at the present time. This is especially the case in regard to such shrubs as camellia, rhododendron, azalea, daphne, and others that are growing and coming into flower. These should be well watered to assist the growth and flowering. All plants that are making growth should be watered, and, if necessary, fed with weak liquid manure.

The exceptions to this rule are carnations and stocks; these two plants should be kept moderately moist only; and if they show any signs of wilting or of discolouring they should be given a dusting with lime.

Beds of annuals should be dusted with copper carbonate if any signs of wilting appear; sweet peas will benefit if given a lime dusting and dressing.

All deciduous shrubs that have lost their leaves should be pruned and thinned according to their requirements. Early pruning is advantageous; and it allows the gardener time to prune roses later on.

The Orchard.

San José scale attack is the urgent work this month. Not only is the scale more easily noticed now, but also the attack is rendered more practicable owing to the absence of the foliage.

If the scale is suspected, very close watch should be kept on every tree while pruning operations are being carried out. If wattle trees, especially the silver, black, or Cootamundra wattles, and also Hawthorn trees are growing near the fruit trees, these should be searched for the scale; and they too should be sprayed if the pest be present. A good strong winter oil should be used in preference to any other spray.

Peach trees should be sprayed with tar distillate to check the advance of green peach aphis; the tar distillate is an excellent ovicide, and is nearly 100 per cent. effective. Cherry trees subject to cherry aphis should be similarly sprayed during the winter.

The Camellia.

All codling moth bandages should be removed from the trees; chemical bands should be burned; and hessian bands, if not burned, should be dipped in boiling water, and dried, before storing. Rough bark on trees, particularly on pear trees, should be scraped away, to destroy hiding places of the larvae.

The Vegetable Garden.

The use of chemical dusts is becoming an important factor of modern pest control in the vegetable garden. Dusts are much easier to handle than liquid sprays, especially in a small area, and they are equally effective. Many kinds of dust are available for combating almost every garden pest; good dust distributors also are on the market.

This is the time of the year when all kinds of aphis are present, and the bean, pea, cabbage, sprouts, turnips, and other plants should all be well treated with a nicotine spray or dust.

It is an effective method to give a light dusting first, so as to unsettle the insects, and to get them on the move. Then next day this should be followed with an effective dose that should check the pest for the season.

Weeds and grasses adjacent to the vegetable garden should be dusted with pestend and lime to check the advance of pea mite, which is often present at this season.

Rhubarb crowns may be replanted, placing them into a very rich soil; almost complete stable manure, if well rotted down, will not injure the crowns. Asparagus beds should be cleared out, cutting out all old stems.

Professional Papers

[This section is devoted to professional papers and articles of a scientific character.]

Halo Blight* of Beans

Varietal Resistance Tests

By A. T. Pugsley, B.Agr.Sc., Assistant Plant Pathologist

THE Halo Blight disease of French beans (*Phaseolus vulgaris* L.) caused by *Phytomonas medicaginis* var. *phaseolicola* Burk.† has been the subject of intensive laboratory and field studies in Victoria as well as in many oversea countries. Reports of earlier work in Victoria on the control of this disease are contained in two papers by Adam (1, 2), and the following is an account of further investigations, including the more recent experiments on varietal resistance carried out during the seasons 1934 to 1936.

Reid (3) reporting a failure to evolve a suitable treatment for seed disinfection has shown that under New Zealand conditions rogueing of diseased plants has proved successful in eliminating the disease. He states also that with adequate isolation, disease-free seed has been produced under normal farming conditions.

The failure which Victorian growers have experienced with this method of disease control is due mainly to the fact that the local weather conditions usually are so favorable for the rapid spread of the disease. If results are expected from this method with susceptible varieties, then severe and continuous rogueing would be necessary. Success would be assured only when the method is practised under fairly dry conditions and when the original seedling infection in the crop is low.

Similar reasons have been given by Adam (2) in explaining the failure of the seed treatment method as a control measure under Victorian conditions. He states:—"Although treatment of infected bean seed in the manner indicated effects a marked reduction in the number of diseased plants that can be ascribed to the use of infected seed, weather factors in the Victorian bean-growing areas during the growth of the crop may operate in a way so favorable to the disease that the initial advantages in the shape of a reduction of infected plants as a result of seed disinfection may be lost." In continuing this aspect of the work further efforts were made in an attempt to eliminate seed infection by the use of more dilute solutions of Germisan for longer periods, but without success.

Laboratory work has shown that the bacteria are in intimate contact with the seed. They have been found in the third layer of the seed coat and also completely surrounding the cotyledons; and although Zaumeyer (4) states that the bacteria do not enter the cotyledons until germination, evidence has been obtained to demonstrate the invasion of the cotyledonary tissue prior to germination. If the seed coats of badly diseased Magnum Bonum seeds are removed, it often is possible to detect small circular, cream-coloured spots on the cotyledons. Stained sections of these lesions reveal the presence of large masses of bacteria in the intercellular spaces and penetrating to a depth of 4 to 5 cells. These facts, together with the small margin of safety that exists between the death points of the bacteria and the seeds, would account for the failure of the chemical seed treatments.

Following the successes of workers in America and Europe with resistant varieties, the later work in Victoria has been concentrated on this aspect. Successful attempts have been made to

* There are three distinct diseases of the French bean (*Phaseolus vulgaris* L.), namely:— (*a*) Halo Blight (*P. medicaginis* var. *phaseolicola* Burk.), (*b*) Bacterial Blight (*P. phaseoli* (E. F. Smith), Bergey *et al*), and (*c*) Bacterial Wilt (*P. flaccumfaciens* (Hedges), Bergey *et al*). In Australia, the widespread and destructive disease Halo Blight is frequently, but incorrectly, referred to as Bacterial Blight or Bacterial Wilt. These latter two diseases have been recorded from Australia only as isolated cases.

† See Appendix 1.

Fig. 1.—Two rows of resistant Burnley Selection, with susceptible Canadian Wonder plants on either side.

develop varieties which, while having the desirable horticultural qualities so well met by the Canadian Wonder variety, possess that additional and all important factor of disease resistance.

"Burnley Selection" of Canadian Wonder.

Adam (2) refers to a "natural" selection of a resistant strain within the Canadian Wonder variety, especially in places where the disease has been severe in the last few years. This phenomenon also was noted by the author in plots at the Melbourne University during February, 1933, and also in subsequent seasons in the field at Orbost. The outstanding resistance of certain plots in contrast with the commercial Canadian Wonder plots, which were destroyed by the disease, is demonstrated in Fig. 1, taken at Orbost during February, 1935.

The experiments conducted at Orbost during the 1934–35 season have established the identity of the strain from the Melbourne University with the strains isolated at Orbost and with the Selection B referred to in Adam's work. The plants of this strain differ from the Canadian Wonder variety in the following characters. They are more bushy and compact in growth, of a lighter green colour, and come into bearing later. The pods are shorter and of a darker green colour, and usually show well-defined constrictions between the seeds. The seeds, although of the same colour, do not have the kidney-shaped appearance of Canadian Wonder seed. In addition, the strain appears to be rather more susceptible to common bean mosaic. In the present paper it is proposed to refer to this strain as "Burnley Selection."

The 1934–35 Orbost tests gave a rather striking demonstration of the resistance of the Burnley Selection strain to halo blight. The three samples of seed used in this test were:—

(1) Commercial unselected Canadian Wonder.

(2) Burnley Selection from the Wahgunyah Nursery.

(3) Burnley Selection from the Burnley Gardens.

Plots of each sample were sown on 13th November, 1934, between single rows of Canadian Wonder seed which previously had been soaked for sixteen hours in a bacterial infusion, prepared by adding broken diseased seeds to water. These "infection" rows soon became 100 per cent. diseased, and so provided a heavy and uniform source of infection. The plots consisted of two rows, which were 3 chains long and replicated four times. On the 7th February, 1935, the plots were inspected. The intervening period was one of cool temperatures, accompanied by severe wind, hail, and rainstorms, so that conditions were most favorable for the spread and development of halo blight. Inspection at this time demonstrated rather strikingly the resistance of both Burnley Selection plots (Fig. 1). These two plots were almost free from disease, except for a few isolated plants, which showed dried out leaf-spot lesions. There was no evidence of the more severe systemic

infection. On the other hand the commercial Canadian Wonder plots were almost totally destroyed; the few remaining plants appeared to be of the resistant type (Fig. 2).

The yields obtained from these plots are set out in Table I.

TABLE I.

Strain of Canadian Wonder.	Burnley Selection (Wahgunyah).	Burnley Selection (Burnley).	Commercial.
Yield of seed per plot—	lb.	lb.	lb.
Plot 1	25	27	7
Plot 2	22	31	6
Plot 3	27	33	6
Plot 4	30	27	6
Total	104	118	25
Average yield per plot ..	26	29.5	6.25

This experiment was repeated under different climatic conditions at Wahgunyah during the 1935–36 season and gave essentially similar results.

Varietal Resistance Tests.

Varietal resistance tests were established during 1935–36 at Orbost and Burnley in an attempt to compare and evaluate the resistance of the new Burnley Selection of Canadian Wonder with other well-known varieties. Included in these trials were four English varieties reported by Ogilvie and Mulligan (5) to possess some resistance to halo blight.

The following varieties were tested:—

Commercial Canadian Wonder.
Pale Dun, Feltham's Prolific } Local varieties fairly resistant.
New Discovery*, Staley's Brown Beauty*, Staley's Star*, Staley's Surprise* } Good local varieties of unknown resistance.
Burnley Selection of Canadian Wonder.
Black Prince, Black Wonder, Ne Plus Ultra, Superlative } English varieties reported to be resistant.

At Orbost these twelve varieties were sown in plots of two rows by 3 chains long, and replicated four times in a randomized manner. Single rows of Canadian Wonder seed (previously soaked in a bacterial infusion prepared by adding broken diseased seeds to water) were sown between these plots. Approximately three weeks after germination the plants in the "soaked" rows were 100 per cent. diseased, and thus provided a heavy and uniform source of infection. Unfortunately flooding followed heavy rains during December and the plots were destroyed. Observations made prior to this indicated that Burnley Selection and Pale Dun were the most resistant, and that Brown Beauty and Canadian Wonder were the most susceptible.

Fig. 2.—Natural selection of the resistant Burnley Selection from the commercial sample of Canadian Wonder.

The plots established at the Burnley Gardens, however, yielded more detailed results. The resistance of Burnley Selection, Pale Dun, and Feltham's Prolific was confirmed, and, in addition, Star, New Discovery, and the English varieties were shown to possess a valuable resistance. In these experiments muslin bags containing the seeds were soaked for sixteen hours in a bacterial infusion and then planted immediately. This treatment also resulted in a very high seedling infection.

Experience has shown that in determining resistance, the

* Confusion exists in Victoria as well as overseas regarding the varietal nomenclature of beans, and the following synonyms are now generally recognized:—
New Discovery with Sutton's Satisfaction, Abundant, and Le Sultan.
Staley's Brown Beauty with Sutton's Premier, and Acme.
Staley's Star with Sutton's Peerless, and Canadian Express.
Staley's Surprise with Sutton's Prince.

best standard for measuring resistance or susceptibility is not necessarily the count of diseased plants, or of pods alone, but rather a combined effect expressed in the form of the severity of the general symptoms. This usually can be indicated by noting the extent of systemic infection. Counts of healthy and diseased pods were made, but these figures did not always represent the true resistance of a variety. For instance a variety such as Star designated as moderately resistant in Table II. showed a relatively high pod infection in one experiment, although the plants possessed a good "general resistance."

As a result of the 1935–36 tests it has been possible to prepare a table and arrange the varieties in order of resistance and in three classes, viz. :— (i) *Very resistant.* Leaf spots not numerous and causing only very slight damage, no systemic infection. (ii) *Moderately resistant.* Leaf spots more common, causing death of some leaves ; small amount of systemic infection. (iii) *Very susceptible.* Many plants dead and systemic infection common. Pod infection counts of two experiments are tabulated also in Table II.

Although three varieties—Tweed Wonder, Magnum Bonum (Flagelot Victoria), and Afrikander (Masterpiece)—were not included in these tests, observations made at other times would place all three in the "very susceptible" class.

It is interesting to note that, while Canadian Wonder proved to be the most susceptible, the Burnley Selection was the most resistant. Although there is no field evidence of either systemic infection or pod spotting of Burnley Selection, both types of symptoms were produced following needle inoculation of plants grown under greenhouse conditions.

The plot of Brown Beauty was completely destroyed by halo blight, except for three plants which stood out to be very resistant, in a manner similar to the Burnley Selection in the Canadian Wonder plot (Fig. 2).

Conclusion.

Following upon the investigations of varietal resistance of beans to halo blight the general conclusion has been made that, with the usual care necessary in selecting the seed to be planted, *the use of any of the above mentioned resistant varieties will give satisfactory control of the disease.* It remains then for the individual grower to select that variety most suitable to the particular demand of the market.

The author wishes to acknowledge the valuable assistance of Mr. G. H. D. Russell, Orbost, on whose farm the field experiments were carried out.

References.

(1) Adam, D. B. "Bacterial Blight of Beans: Its Nature and Control." *J. Dept. Agric. Vic.* 1933, vol. 31, p. 1.
(2) Adam, D. B. "'Halo Blight' in French Beans." *J. Dept. Agric. Vic.* 1936, vol. 34, p. 34.
(3) Reid, W. D.—"Production of Wilt Free Beans." *N.Z. J. Agric.* 1934, vol. 49, p. 164.

Table II.—Resistance of Varieties to Halo Blight.

Class.	Order of Resistance.	Pod Infection.			
		3rd January, 1936.		26th February, 1936.	
		Diseased Pods.	Severity of Spotting.	Diseased Pods.	Severity of Spotting.
		%		%	
Very resistant	Burnley Selection (1)	0	..	0	..
	Palo Dun (2)	19	Slight	2	Slight
Moderately resistant ..	Star	84	Heavy	15	Slight
	New Discovery (3)	....	..	2	Slight
	Black Prince (3)	59	Medium	2	Slight
	Black Wonder (3)	46	Medium	2	Slight
	Feltham's Prolific (3)	27	Medium	2	Slight
	Superlative (3)	35	Medium	2	Slight
	No Plus Ultra (4)	47	Medium	6	Slight
Very susceptible	Surprise (5)	75	Heavy	37	Heavy
	Brown Beauty (6)	..	..	28	Heavy
	Canadian Wonder (7)	85	Heavy	38	Heavy

(4) Zaumeyer, W. J.—"Comparative Pathological Histology of Three Bacterial Diseases of Bean." *J. Agric. Res.* 1932, vol. 44, p. 605.
(5) Ogilvie, L., and Mulligan, B. O.—"Progress Report on Vegetable Diseases IV." *Annual Report Agric. and Hort. Res. Stn.*, Long Ashton, Bristol, for 1932, p. 104.

Appendix 1.

Although the name *Phytomonas medicaginis* var. *phaseolicola* given to the bacterium causing halo blight of beans, by Burkholder in 1926, is widely accepted and in general usage, it is considered that attention should be directed at the use of the specific name *medicaginis*. Its adoption, of course, suggests that the halo blight organism is more closely related to *P. medicaginis* than to other bacterial species. However, if morphology and cultural characteristics are to be the criteria that determine specific affinity and justify the creation of varietal names, it is difficult to understand how one could deny the claim that this bean organism is a variety of some other green fluorescent organism, say *P. mori*. Indeed *mori* as a specific name might be considered to have superior claims to priority, as it was used some time before *medicaginis*.

A consequence of the arbitrary adoption of the specific name *medicaginis* is illustrated in the work of Reid (*N.Z. J. of Agric.* 43, p. 408, 1931). Reid refused to accept pathogenicity as a classificatory character, and considered the variety *phaseolicola* to be untenable for the New Zealand organism, and therefore adopted the name *P. medicaginis*.

Actually the general adoption of Burkholder's name is the only justification for the trinomial, and in using it there is always the implication of a particular affinity which may be misleading. More detailed studies, including among others that of serological analysis, would eventually lead to a basis on which questions of specific and varietal differentiation could be determined more satisfactorily.

Tobacco Investigations in Victoria (*Continued from page 291.*)

XP, a mercuric compound, appeared to exhibit a fungicidal value about equal to that of the copper-carrying sprays, Bordeaux, Copper Emulsion, and Colloidal Copper.

Effect of Fungicide on the Seedling.

The various fungicides used differed markedly in their effect on the tobacco seedling. Colloidal Sulphur sprays either singly or in combination with Malachite Green had no observable effect on the growth of the tobacco seedling. Bordeaux 2:1:50 and Bordeaux 4:2:50 caused burning and distortion of the plant; 2:1:50 being more severe than 4:2:50. Where Malachite Green 1 in 10,000 was added to Bordeaux 2:1:50, seedlings made practically no further growth and never reached transplanting size.

The only other spray to cause any burning of the seedling was Copper Emulsion. Here the effect was limited to the very early stages of growth, and these seedlings later made a good recovery from a slight initial scorching and reached the planting-out stage in a satisfactory condition. Colloidal Copper sprays caused general caking on the surface of the seed bed, and where the spray tended to concentrate in slight depressions in the seed bed the seedlings were liable to yellow and die off.

Effect of Sprays on Transplants.

From section B and C in both Group 1 and 2, fifty seedlings were pulled from each plot except those sprayed with Bordeaux 2:1:50 and Bordeaux 2:1:50 + Malachite Green 1 part in 10,000. In these two latter treatments the seedlings were so severely scorched as to be unfit to transplant. Seedlings were transplanted on 28th November, and by 3rd January the following progress had occurred:—

Seedlings from Group 2 had generally made better growth than those from Group 1. This probably was due to the fact that plots in Group 2 remained practically free from mould throughout the season although the addition of Agral I as a wetter to sprays applied to Group 2 may have mitigated to some degree the effect of spray treatments on the tobacco seedlings. From plots sprayed with Bordeaux 4:2:50 only 1 per cent. of plants survived.

Seedlings from plots sprayed with Colloidal Sulphur struck poorly and made poor subsequent growth. Seedlings from plots sprayed with Shirlan XP showed the best strike and made greatest headway, followed closely by seedlings from the unsprayed control plots, followed in turn by those from plots sprayed with Colloidal Copper and Copper Emulsion. Summarizing, it is concluded that of the spray treatments tested at Shepparton in the season 1935, Shirlan XP exhibits the most desirable characteristics, Colloidal Copper and Copper Emulsion being next in order of preference. While the fungicidal power of Bordeaux sprays is considerable, its effect on the growth of the seedling destroys its value as a spray for tobacco seedling nurseries.

While weekly applications of spray treatments fail to control Blue Mould, bi-weekly applications exert a marked degree of control in seasons of light infection.

Standard Herd Records

For Quarter ended 31st March, 1936

In the following is set out the records of all cows which completed a lactation during the quarter. The number is 302, of which 228 qualified for the certificate. The figure in brackets after the owner's name shows the number of entries.

The amount of butter-fat required for qualification varies according to the age of the animal (up to five years at time of calving), the standard being as follow:—

Junior 2 year old (under 2½ years at time of calving)	230 lb. butter fat.
Senior 2 year old (between 2½ and 3 years at time of calving)	250 lb. butter fat.
Junior 3 year old (between 3 and 3½ years at time of calving)	270 lb. butter fat.
Senior 3 year old (between 3½ and 4 years at time of calving)	290 lb. butter fat.
Junior 4 year old (between 4 and 4½ years at time of calving)	310 lb. butter fat.
Senior 4 year old (between 4½ and 5 years at time of calving)	330 lb. butter fat.
Mature cow 5 years and over	350 lb. butter fat.

(Except where otherwise stated, the period of Test was 273 days.)

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Allen, F. de V., Toora, Jersey (3).										
Glen Alice Charm ..	39795	22.6.35	16	7,526	5·24	394·26	290	Sr. 3	285, 401 ..	Clarendon Eyre Student Prince
Wood Gem	36774	15.6.35	9	7,058	5·73	404·25	330	Sr. 4	249, 411 ..	Blackwood Valley Skim
Wood Model	36775	9.5.35	20	7,751	5·31	411·88	330	Sr. 4	358, 350 ..	Blackwood Valley Skim
Atkinson, W. K., Swan Hill, Dairy Shorthorn (2).										
Willow Park Duchess 23rd..	D.S.H.B.A.	22.5.35	23	8,235	4·03	331·72	250	Sr. 2	.. ..	Willow Park Silvermine 4th
Willow Park Fairy 8th ..	D.S.H.B.A.	22.5.35	21½	7,040	3·96	279·04	250	Sr. 2	.. ..	Willow Park Silvermine 4th
Austin, F., Lara, Jersey (7).										
Avalon Gladstar's Duchess	Vol. 22	12.5.35	9	4,862	5·51	268·10	230	Jr. 2	.. ..	Avalon Gladstar 2nd
Avalon Gladstar's Pansy 6th	38723	1.6.35	4	5,982	5·26	314·50	330	Sr. 4	285, 334 ..	Avalon Gladstar 2nd
Avalon Mercedes 16th's Queen	36827	11.6.35	8	7,346	6·48	476·16	330	Sr. 4	354, 445, 517	Avalon Mercedes Chief 16th
Avalon Noble's Duchess 3rd	Vol. 22	27.5.35	8	4,211	5·85	246·28	230	Jr. 2	.. ..	Noble of Avalon
Avalon Noble's Pansy 9th	Vol. 22	11.6.35	13	7,643	5·20	397·50	270	Jr. 3	328 ..	Noble of Avalon
Avalon Noble's Pansy 11th	Vol. 22	7.6.35	8	4,109	5·74	236·02	230	Jr. 2	.. ..	Noble of Avalon
Avalon Starbright Duchess	Vol. 22	16.5.35	17	8,296	6·02	499·46	250	Sr. 2	429 ..	Brucevale Lord Starbright
Axford, W., Camperdown, Jersey (13).										
Leura Annette 2nd ..	25234	5.4.35	24½	7,881	5·13	404·57	350	Mature	309, 404, 358	Monitor of Leura
Leura Beauty 6th ..	32910	8.5.35	15½	7,808	5·58	435·56	350	Mature	365, 353 ..	Grant of Melrose
Leura Beauty 9th ..	36837	20.4.35	14	6,308	5·85	368·96	350	Mature	375, 343 ..	Curiosity's King of Comely Banks
Leura Butterfly 5th ..	Vol. 23	10.5.35	12½	5,081	5·20	264·35	230	Jr. 2	.. ..	Leura Statesman
Leura Foxglove 2nd ..	40679	12.5.35	16½	7,787	5·41	421·32	350	Mature	292, 356 ..	Admiral of Leura
Leura Handsome Girl 4th ..	44880	8.6.35	15½	6,261	5·62	351·60	270	Jr. 3	284 ..	Mornmoot Mosstrooper
Leura Lady Elector 3rd ..	24236	21.4.35	25	9,728	5·57	542·14	350	Mature	333, 382, 552, 581	Admiral of Leura
Leura May 7th	36840	26.6.35	..	10,616	5·31	564·20	350	Mature	444, 495, 597	Curiosity's King of Comely Banks
Leura May 12th ..	44882	21.5.35	12½	5,979	5·37	320·85	270	Jr. 3	.. ..	Maitland Petal's Viscount of Elouera
Leura May Queen 2nd ..	44883	9.5.35	15	7,063	4·82	340·61	250	Sr. 2	217 ..	Mornmoot Mosstrooper
Leura Patricia 7th ..	36843	20.4.35	17	7,274	5·91	430·23	350	Mature	295, 273, 274	Admiral of Leura
Leura Piccaninny 7th ..	44886	14.6.35	13½	6,632	5·48	363·62	270	Jr. 3	302 ..	Leura Statesman
Leura Silverbelle 4th ..	24242	22.4.35	20	8,619	5·20	447·86	350	Mature	341, 386 ..	Admiral of Leura
Black, Mrs. A. J., Noorat, Jersey (1).										
Noorat Air Lady ..	36909	30.3.35	11	6,621	5·59	370·25	310	Jr. 4	326, 379 ..	Air Lord of Banyule
Black, I. S., Noorat, Ayrshire (5).										
Ben Kell Poppy 3rd ..	17318	11.4.35	18	6,750	4·51	304·70	350	Mature	275, 270, 321, 347	Ben Kell True Line
Mount Noorat Alert ..	24144	24.5.35	17½	8,453	4·21	355·58	330	Sr. 4	295, 385 ..	Scottish Major of Gowrie Park
Mount Noorat Georgina 3rd	27556	14.4.35	14	5,643	4·53	255·49	230	Jr. 2	.. ..	Gowrie Park Scottish Hero
Mount Noorat Janice 2nd	26587	16.4.35	10	9,255	3·97	367·43	290	Sr. 3	416 ..	Gowrie Park Scottish Hero
Mount Noorat Pyrene 2nd	26593	23.6.35	11	7,640	4·45	340·06	310	Jr. 4	328, 384 ..	Gowrie Park Scottish Hero

The number of cows constituting a herd, for purposes of competition for the annual herd prize of the Standard Herd Test, has been raised from 10 (ten) to 15 (fifteen), and in future competitions all herds in excess of the minimum number of 15 will receive an allowance of ½ lb. butter-fat per cow. These conditions will come into operation with the 1936-37 Test.

THE VICTORIA HERD

of Red Poll Cattle

Maintained for Milk and Beef at the State Research Farm, Werribee.

BULL CALVES

Six For Sale at Reduced Prices

No. 1. VICTORIA GOBLIN (1647A.). Born 18th December, 1932 — *Price* 40 guineas f.o.r. Werribee
Sire: Victoria Brilliance (1258 A). *Dam:* Victoria War Ghost (2347 A).
Victoria War Ghost produced 521 lb. butter-fat in 273 days, and 623 lb. in 365 days.

No. 2. VICTORIA DONALD. (AA., C.R.). Born 16th March, 1935 — *Price* 30 guineas f.o.r. Werribee.
Sire: Woodburn Peter Pan (Imp. in utero) (1504 AA). *Dam:* Victoria Rose Major (5AA).
Victoria Rose Major produced 455 lb. butter-fat in 273 days, and 531 lb. in 365 days. (An AA Calf).

No. 3. VICTORIA SALUTE. (A., C.R.). Born 12th June, 1935 .. *Price* 17 guineas f.o.r. Werribee
Sire: Woodburn Peter Pan (Imp. in utero) (1504 AA). *Dam:* Victoria Greta (3023 A).
Victoria Greta produced 377 lb. butter-fat in 273 days as Sr. 4.

No. 4. VICTORIA VALENTINE. (AA., C.R.). Born 30th September, 1935 — *Price* 20 guineas f.o.r. Werribee
Sire: Chandpara Valentine (762 AA). *Dam:* Victoria Debutante (3513 AA).
Victoria Debutante produced 261 lb. butter-fat in 273 days as Sr. 2. (An AA calf.)

No. 5. VICTORIA HERCULES. (A., C.R.). Born 25th January, 1936 — *Price* 14 guineas f.o.r. Werribee
Sire: Chandpara Valentine (762 AA). *Dam:* Victoria Johanna (3912 A).
Victoria Johanna produced 321 lb. butter-fat in 273 days as Jr. 2

No. 6. VICTORIA SILENCER. (A., C.R.). Born 13th March, 1936 — *Price* 10 guineas f.o.r. Werribee
Sire: Victorian Goblin (1647 A). *Dam:* Victoria Manifold (A., Vol. 8).
Victoria Manifold is now undergoing her first test.

Prices are based on the average butter-fat production of the dam in 273 days, except in the case of progeny of heifers without completed test, the price then being 10 guineas.

An amount of 2 guineas per quarter maintenance has been added to calves 3 months old and over.

Inspection cordially invited. For further particulars apply to—

THE DIRECTOR OF AGRICULTURE, MELBOURNE, C.2; OR THE MANAGER, STATE RESEARCH FARM, WERRIBEE.

The Journal of Agriculture

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.....

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Broad, A. A., Sutton Grange, Jersey (3).										
Grangelea Machree ..	44173	29.4.35	15	4,905	6·74	330·59	270	Jr. 3	269 ..	Grangelea Daffodil's Hero
Grangelea Primrose ..	23007	25.4.35	27	8,669	5·23	453·63	350	Mature	370, 462, 459, 473, 465, 445, 433	Mistletoe 2nd's V. C. of Tarnpirr
Grangelea Rosella 3rd ..	Vol. 22	22.6.35	17½	5,710	5·59	319·19	230	Jr. 2	.. ..	Banyule Macon
Calf, A. J., Werribee South, Jersey (2).										
Clydevale Carrilla ..	33266	21.6.35	18½	7,758	5·46	423·32	350	Mature	426 ..	Staghorn Master's Defiance
Illillonette Bing Boy's Tangerine	Vol. 22	25.6.35	..	6,757	4·63	313·01	250	Sr. 2	.. ..	Clarendon Eyre Eminent's Bing Boy
Chadderton, J. E., Hamilton, Jersey (5).										
Glen Leigh Dawn ..	33094	2.6.35	14	7,350	5·37	394·47	350	Mature	328, 356, 393	Strathkellar Topthorn
Glen Leigh Dewdrop 2nd ..	39341	16.5.35	11	5,231	5·48	286·43	270	Jr. 3	278 ..	Strathkellar Topthorn
Glen Leigh Dolly ..	39343	7.5.35	11	6,458	5·21	336·40	270	Jr. 3	273 ..	Strathkellar Topthorn
Glen Leigh Dora ..	25789	18.5.35	20½	8,685	5·65	490·98	350	Mature	382, 495, 491, 495, 572	Gadabout of Danton
Glen Leigh Dream ..	37040	30.5.35	14½	7,172	5·22	374·53	290	S .3	231, 312	Strathkellar Topthorn
Chirnside, R. M., Whittlesea, Jersey (1).										
Mornmoot Princess Madeira 3rd	45269	14.4.35	20½	9,165	6·01	551·25	230	Jr. 2	.. ..	Staghorn Larkspur's Majestic
Christian, Mrs. N. C., Mortlake, Jersey (1).										
Noorat Gauze	32987	25.4.35	16	6,794	5·49	372·81	350	Mature	259, 305, 318	Cellist of Warenda
Clarke, F. W., Toora, Jersey (2).										
Banyarra Syringa 3rd ..	42879	22.6.35	7½	6,510	5·19	337·90	290	Sr. 3	309 ..	Banyule Ventilation
Wood Choice	28590	5.5.35	16½	5,285	6·38	337·40	350	Mature	423 ..	Blackwood Valley Skim
Clark, P. W., Whittlesea, Jersey (1).										
Coodardy Gloria 5th ..	C.R.	26.5.35	4	6,465	5·57	360·09	250	Sr. 2	.. ..	Kantara Don Juan
Colenso, L. W., Alvie, Jersey (12).										
Braemar Vanilla 3rd ..	33743	20.6.35	15	6,400	5·77	369·28	330	Sr. 4	324 ..	Avonleigh Queenie's Twylight
Normandie Buttercup 2nd	33188	19.4.35	22	8,256	5·76	475·44	350	Mature	317, 486, 412, 447	Peer of Lewisham
Normandie Buttercup 5th ..	45470	1.4.35	9½	4,634	6·22	288·14	250	Sr. 2	.. ..	Normandie White Peer
Normandie Golden Nancy ..	Vol. 22	4.5.35	19	6,144	5·73	352·23	230	Jr. 2	.. ..	Normandie Golden Peer
Normandie Hawthorn ..	33190	15.5.35	19	7,784	5·11	397·42	350	Mature	320, 427, 395, 381	Peer of Lewisham
Normandie Hawthorn 2nd	33191	4.5.35	22½	9,632	5·34	514·46	330	Sr. 4	387, 496 ..	Peer of Lewisham
Normandie Ilma 3rd ..	45472	30.4.35	21½	6,964	5·39	375·57	250	Sr. 2	241 ..	Peer of Lewisham
Normandie Mayflower 3rd	33193	29.4.35	14	6,798	5·43	369·47	350	Mature	290, 277, 382, 362	Peer of Lewisham
Normandie Mayflower 4th	33194	17.4.35	17	6,701	5·80	388·86	330	Sr. 4	376, 286, 381	Normandie White Peer
Normandie Mayflower 6th	45473	12.5.35	20½	8,045	5·17	415·58	270	Jr. 3	274 ..	Normandie Majestic
Normandie Primrose 3rd ..	45474	29.4.35	13½	5,922	5·65	334·76	250	Sr. 2	280 ..	Peer of Lewisham
Normandie Thelma ..	24304	27.4.35	16½	7,457	4·86	362·47	350	Mature	275, 356, 332, 368, 286, 397	Thelma's King of St. Albans
Coughlin, C., Catani, Jersey (6).										
Gladys Park Goldmine's Beauty 3rd	Vol. 22	4.4.35	17	6,390	5·26	336·03	230	Jr. 2	.. ..	Werribee Bluebell's Masterpiece
Gladys Park Leila ..	Vol. 22	6.6.35	14	4,632	6·01	278·30	230	Jr. 2	.. ..	Werribee Bluebell's Masterpiece
Gladys Park Lillian ..	Vol. 22	4.5.35	13	5,933	5·84	346·68	250	Sr. 2	.. ..	Werribee Bluebell's Masterpiece
Gladys Park Master's Lady	Vol. 22	9.6.35	12	4,251	6·55	278·54	230	Jr. 2	.. ..	Werribee Bluebell's Masterpiece
Gladys Park Master's Petal	Vol. 22	4.4.35	15	6,216	5·23	324·97	230	Jr. 2	.. ..	Werribee Bluebell's Masterpiece
Gladys Park Rosebud ..	Vol. 22	29.5.35	14	5,379	6·35	341·34	250	Sr. 2	.. ..	Werribee Bluebell's Masterpiece
Crawford, Mrs. E., Traralgon, Jersey (4).										
Balniel Marie	Vol. 22	5.5.35	9½	4,603	5·07	233.29	230	Jr. 2	.. ..	Coolooli Rye's Mozart
*Crystal Brook Flirt ..	Vol. 22	19.4.35	4	2,340	4·72	110·55	230	Jr. 2	.. ..	Kameruka Eclipse's Dandy
†Crystal Brook Tilly ..	Vol. 22	6.4.35	4	2,760	5·06	139·74	250	Sr. 2	.. ..	Kameruka Eclipse's Dandy
Turro Park Eminent Duchess	33240	19.6.35	..	8,915	4·99	444·50	330	Sr. 4	376, 409, 474	Aveley Drummer
Dee, J., Clyde North, Jersey (1).										
Clydevale Daffodil ..	39292	5.6.35	12	5,871	6·15	361·12	330	Sr. 4	307 ..	Staghorn Master's Defiance
De La Rue, N. C., Weering, Jersey (3).										
Lucerne Vale Madeira 2nd	Vol. 22	23.6.35	19½	5,786	5·90	341·60	230	Jr. 2	.. ..	Werribee Fancy Masterpiece
Lucerne Vale Master's Queen 2nd	Vol. 22	15.5.35	12	4,538	6·06	274·90	230	Jr. 2	.. ..	Werribee Fancy Masterpiece
Lucerne Vale Masterpiece's Trixie 9th	Vol. 22	31.3.35	17	5,091	5·16	262·76	230	Jr. 2	.. ..	Werribee Fancy Masterpiece

* 150 days in test. † 180 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Department of Agriculture, Burnley, Jersey (2).										
Victoria Sea Foam ..	46574	14.4.35	12½	4,392	6·54	287·29	230	Jr. 2	.. ..	Victoria Master's Mariner
Victoria Flirt	33272	24.5.35	22	7,614	6·38	485·44	350	Mature	359, 390, 484	Victoria Jack Tar
Department of Agriculture, Werribee, Friesian (5).										
Victoria Contralto ..	Vol. 13	2.6.35	21	7,811	3·35	261·81	230	Jr. 2	.. ..	Victoria Joyous Mercedes
Victoria Chorus Girl ..	3759	13.6.35	31½	12,184	3·75	456·79	330	Sr. 4	407, 510 ..	Dominion Oakdale
Victoria Jingle Bell ..	4288	1.6.35	23	9,017	3·37	303·66	270	Jr. 3	387 ..	Victoria Joyous Mercedes
Victoria Sonorous Plebe ..	4289	3.6.35	37	12,550	3·33	418·47	290	Sr. 3	441 ..	Victoria Topnote
Victoria Top Knot ..	Vol. 13	23.6.35	N.O.C.	8,342	3·08	256·99	230	Jr. 2	.. ..	Victoria Joyous Mercedes
Department of Agriculture, Werribee, Red Poll (10).										
Victoria Algiers	3004A	13.5.35	12	8,505	3·89	330·69	350	Mature	248, 263, 312	Victoria Royal Ringer
Victoria Ambrosia ..	3891A	9.4.35	10½	7,860	3·88	305·26	270	Jr. 3	224 ..	Victoria Vice Captain
Victoria Avrette	3893A	24.6.35	13	6,251	4·67	291·88	270	Jr. 3	296 ..	Victoria Vice Captain
Victoria Bellalae ..	2304A	6.6.35	29	9,398	4·16	390·59	350	Mature	252, 284, 352, 447	Vice Regal
Victoria Bright Blue ..	3011A	18.6.35	8½	6,747	4·15	279·78	310	Jr. 4	248, 291 ..	Dominion Bright Belgian
Victoria Charm	3013A	6.5.35	11	7,316	4·21	308·29	330	Sr. 4	235, 230 ..	Earl of Beaconsfield
Victoria Eagle	2315A	11.5.35	9½	6,119	4·82	295·16	350	Mature	298, 340, 383, 385	Vice Regal
Victoria Fragrance ..	3907A	30.3.35	15	6,191	3·76	232·57	230	Jr. 2	.. ..	Victoria Brilliance
Victoria Ghazal	2320A	3.4.35	14½	6,495	4·05	263·12	350	Mature	253, 353, 369	Vice Regal
Victoria Greta	3023A	12.6.35	20½	8,435	4·14	349·16	350	Mature	256, 341, 377	Vice Regal
Desmond, J. J., Rochester, Jersey (1).										
Macroom Edna 2nd ..	Vol. 23	20.6.35	23	7,253	5·18	375·41	250	Sr. 2	337 ..	Glen Alvie Statesman
Dobson, R. J. M., Acheron, Jersey (1).										
Wattle Grove Design's Queen	46646	16.4.35	23½	7,151	5·78	413·64	250	Sr. 2	.. ..	Design's Ruler (Imp.)
Dookie Agricultural College, Dookie, Ayrshire (2).										
Dookie Adept	24813	2.5.35	31	12,788	3.92	500·68	350	Mature	406, 425 ..	Longerenong Laurie
Dookie Dinah	23665	10.4.35	14½	11,247	4·35	489·51	350	Mature	371, 490, 413	Dookie Pater
Messrs. Downie Bros., Ripplebrook, Ayrshire (8).										
†Glen View Beauty 2nd ..	Vol. 28	24.4.35	..	3,780	4·62	174·72	250	Sr. 2	.. ..	Gowrie Park Standard Bearer
Glen View Bella 2nd ..	26308	9.6.35	..	9,240	3.85	355·96	350	Mature	194, 270, 281	Gowrie Park Dairyboy
*Glen View Betty ..	21604	1.4.35	4	5,265	3·88	204·42	350	Mature	259, 316 ..	Gold Coin of Fairfield Park
Glen View Betty 6th ..	C.R.	8.4.35	16	7,176	4·20	301·12	230	Jr. 2	.. ..	Gowrie Park Standard Bearer
Glen View Brownie 4th ..	26310	3.4.35	13	7,519	4.69	352·92	330	Sr. 4	320, 307 ..	Gowrie Park Dairyboy
‡Glen View Innocence 3rd	27304	15.5.35	4	7,270	3·82	277·90	290	Sr. 3	265 ..	Gowrie Park Standard Bearer
Glen View Innocence 4th ..	C.R.	28.5.35	..	6,001	4·25	255·31	270	Jr. 3	233 ..	Gowrie Park Standard Bearer
Glen View Kathie 2nd ..	23894	8.5.35	4	7,091	4·06	288·19	350	Mature	283, 329 ..	Gowrie Park Dairyboy
Dwyer, G., Balwyn, Jersey (1).										
Karalee Linda 4th ..	Vol. 22	13.6.35	13½	5,682	5·88	334·25	230	Jr. 2	.. ..	Karalee Volunteer 8th
Evans, A., Heywood, Jersey (7).										
Boronia Farm Cora ..	43101	1.5.35	9	4,439	5·33	236·41	230	Jr. 2	.. ..	Boronia Farm Chief
Boronia Farm Lady Love	Vol. 22	1.6.35	9	4,121	5·18	213·41	230	Jr. 2	.. ..	Boronia Farm Noble
Boronia Farm May ..	23129	22.6.35	12	7,059	4·71	332·38	350	Mature	236, 181, 300, 327, 334, 383	Frost of Castlemaddie
Boronia Farm Melba ..	43103	11.6.35	9	5,609	5·43	304·70	250	Sr. 2	297 ..	Nairana Top Note
Kelvin Brook Lotus ..	29547	29.5.35	21	8,219	5·11	419·88	350	Mature.	322, 355, 304, 352	Staghorn Lotus Cream's Masterpiece
Glenaire Silvermine 2nd ..	39855	18.6.35	12	6,204	5·32	330·11	290	Sr. 3	254, 359 ..	Glenaire Soprano's King
Rosemont Lassie Fowler 3rd	26065	1.6.35	20	9,285	5·05	468·50	350	Mature	252, 403, 443, 462	Rosella 2nd's Noble of Rosemont
Fixter, A., Boisdale, Guernsey (1).										
Avonview Daphne ..	3309	1.6.35	18½	6,239	5·08	316·93	270	Jr. 3	.. ..	Melbourne Sandboy 6th
Fixter, W., Boisdale, Jersey (4).										
Olivedale Duchess 3rd ..	45548	26.6.35	14	7,146	5·38	384·66	270	Jr. 3	287 ..	Studleigh Dandy
Olivedale Queenie 2nd ..	45549	5.4.35	11	4,368	6·96	304·05	270	Jr. 3	268 ..	Studleigh Dandy
Olivedale Vanilla ..	41373	3.6.35	24	7,962	5.95	474·08	330	Sr. 4	334, 428 ..	Studleigh Dandy
Studleigh Duchess 6th ..	28698	25.4.35	22½	8,442	5·43	458·17	350	Mature	265, 294, 291, 388	Werribee Madeira Starbright's King
Messrs. Foster Bros., Boisdale, Jersey (5).										
Boisdale Brunette 4th ..	Vol. 22	2.4.35	13½	4,385	5·62	246·37	230	Jr. 2	.. ..	Gladiator of Springhurst
Boisdale Canary 2nd ..	43047	7.6.35	17	5,829	5·31	309·77	270	Jr. 3	262 ..	Gladiator of Springhurst
Boisdale Twilight ..	Vol. 22	12.5.35	16½	4,355	5·41	235·55	230	Jr. 2	.. ..	Boisdale Dazzler
Hazeldale Ginger Princess	40175	16.6.35	7½	5,072	5·03	255·22	330	Sr. 4	276 ..	Dinkum of Banyule
Myrtleview Sweet Maid ..	41208	19.5.35	17½	6,140	6·24	383·12	290	Sr. 3	311, 284 ..	Summerhill Economist
Messrs. Gardener Bros., Welshpool, Jersey (1).										
Lauriston Mistress Pansy 2nd	Vol. 22	7.5.35	13	4,704	5·25	246·75	230	Jr. 2	.. ..	Rathlyn Lily's Master

† 210 days in test (sold). * 240 days in test. ‡ 250 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Gay, R. G., North Devon, Jersey (4).										
Elm Grove Alfalfa ..	34020	11.5.35	16	6,656	5·54	368·54	350	Mature	272, 382, 389	Clarendon Eyre Silver King
Elm Grove Daphne ..	39040	4.5.35	21	7,669	5·48	420·48	310	Jr. 4	334, 381 ..	Melrose Butterman
Elm Grove Jessie Fowler 3rd	43736	29.5.35	23	8,339	4·81	401·03	290	Sr. 3	289 ..	Warenda Ragtime Dominant
Warenda Dal Monte 3rd ..	34023	7.5.35	20½	8,864	5·32	471·43	350	Mature	398, 397 ..	Warenda Snap
Gregg, V., Whittlesea, Jersey (1).										
Stoneycroft Plum ..	37438	19.5.35	15	6,771	5·49	371·54	350	Mature	283, 319, 357	Kantara Don Juan
Handbury, J. E. and Son, Toora, No. 2 Farm, Jersey (3).										
Tooravale Lassie Fowler 4th	28734	7.6.35	8½	6,206	5·45	337·99	350	Mature	213, 257, 380	Goldspeck of Tooravale
Tooravale Lassie Fowler 12th	42256	1.4.35	10½	6,216	6·34	393·80	290	Sr. 3	235, 218 ..	Goldspeck of Tooravale
Tooravale Milkmaid 3rd ..	25906	3.6.35	7½	5,007	5·72	286·50	350	Mature	237, 280, 334, 368	Welkin of Melrose
Handley, S. C., Dandenong, Jersey (2).										
Barrowby Queen 2nd ..	38809	24.5.35	18	7,284	5·31	386·63	290	Sr. 3	286, 383 ..	Grangelea Progress
Barrowby Queen's Bettie	Vol. 22	5.4.35	21½	6,651	4·94	328·34	230	Jr. 2	.. ..	Grangelea Progress
Harvey, T., Boisdale, Jersey (2).										
Jerseyholm Bluebell 15th ..	40373	26.6.35	19½	7,305	5·33	389·25	270	Jr. 3	354 ..	Werribee Master's Expert
Jerseyholm Empress 29th	40376	14.4.35	13	4,952	5·82	288·11	290	Sr. 3	283 ..	Werribee Master's Fox
Henderson, W., Grasmere, Ayrshire (8).										
Carracoorte Balm 17th ..	27002	4.4.35	7½	6,629	4·80	317·88	270	Jr. 3	.. ..	Carracoorte Gerty's Producer
Carracoorte Bellona's Image	25902	20.4.35	4½	6,816	4·78	326·12	270	Jr. 3	222 ..	Carracoorte Pilot
Carracoorte Brownie 24th	27005	30.3.35	13	5,844	4·32	252·20	270	Jr. 3	.. ..	Carracoorte Gerty's Producer
Carracoorte Bunty 22nd ..	27006	1.5.35	7	6,013	4·81	289·50	270	Jr. 3	304 ..	Carracoorte Bluebell's Favourite
*Carracoorte Gerty 12th ..	C.R.	1.6.35	4	6,468	4·50	291·04	270	Jr. 3	.. ..	Carracoorte Gerty's Producer
Carracoorte Jane 3rd ..	27011	16.6.35	6½	6,365	4·91	312·39	270	Jr. 3	.. ..	Carracoorte Gerty's Producer
Carracoorte Violet 8th ..	C.R.	1.5.35	10	7,158	4·20	300·93	310	Jr. 4	214 ..	Blue Bell's Pride of Glencourt
†Strathkellar Nymph ..	27754	1.5.35	4	3,855	5·29	204·05	270	Jr. 3	186 ..	Carracoorte Gerty's Producer
Hercus, T. B., Hayanmi, Jersey (1).										
Mologa Buttercup ..	Vol. 22	25.5.35	17½	5,501	4·49	246·80	230	Jr. 2	.. ..	Belgonia Hinkler
Herd, L. J., Heidelberg, Jersey (2).										
Banyarra Norma 4th ..	Vol. 22	24.6.35	10	5,165	6·22	321·44	230	Jr. 2	.. ..	Retford King Bracken
Berrington Soprano 3rd ..	43003	23.5.35	..	4,959	5·51	273·43	330	Sr. 4	.. ..	Superstrain of Banyule
Hore, E., Horfield, Jersey (1).										
Milvue Madeira Chimes ..	Vol. 23	3.6.35	7	4,587	5·33	244·28	230	Jr. 2	.. ..	Balcairn Mabel's Master
Hore, M. T., Horfield, Friesian (1).										
Greenvale Flora	App. 2, Vol. XI.	13.5.35	35	12,399	3·65	452·99	350	Mature	484, 390 ..	Victoria Double Oak De Kol
Huffer, J. A., Gormandale, Jersey (1).										
Glen Valley Quick Sand 2nd	40004	12.5.35	..	6,386	5·81	370·76	290	Sr. 3	310 ..	Melrose Ensign
Hutchinson, J. and Sons, Somerville, Jersey (5).										
‡Somerville April Princess ..	Vol. 22	8.4.35	..	5,400	6·08	328·03	230	Jr. 2	.. ..	Somerville Chief Ruler
§Somerville Babs 6th ..	41977	17.5.35	..	9,405	4·84	455·66	310	Jr. 4	377, 679 ..	Banyule Aeronaut
‖Somerville Rio Rita 3rd ..	Vol. 22	13.6.35	..	4,635	5·13	237·99	230	Jr. 2	.. ..	Somerville Chief Ruler
‖Somerville Rosebud 2nd ..	41980	17.6.35	..	5,753	5·27	303·05	290	Sr. 3	407 ..	Somerville Reputation
‡Somerville Rosina ..	Vol. 22	12.4.35	..	4,965	5·66	281·07	230	Jr. 2	.. ..	Somerville Reputation
Ingram, A. B., Millgrove, Illawarra Milking Shorthorn (1).										
Allawalla Judy 4th ..	5048	9.5.35	12	8,437	3·71	313·06	350	Mature	243, 248 ..	Premier of Fairfield
King, H. W., Warragul, Jersey (1).										
Karoola Marie	25442	26.6.35	N.O.O.	6,215	5·16	320·48	350	Mature	319, 413, 403, 450, 358, 393	Waverley's Count of Glen Valley
Knowles, T., Dandenong, Ayrshire (2).										
Dandy Clover	C.R.	30.4.35	12	7,539	4·07	306·96	270	Jr. 3	.. ..	Dandy Masterpiece
Dandy Countess	C.R.	17.5.35	20	7,187	3·96	284·30	250	Sr. 2	.. ..	Dandy Baronet
Le Noury, E., Werribee South, Guernsey (5).										
Melbourne Daphne 4th ..	1296	23.5.35	5	4,293	5·14	220·50	350	Mature	259 ..	David Beatty of Melbourne
Melbourne Matron ..	3095	25.6.35	10½	5,675	5·06	287·12	330	Sr. 4	275, 290 ..	Melbourne Don 7th
Werribee Camilla's Darling	3481	12.4.35	20	7,629	5·09	388·38	290	Sr. 3	263 ..	Camilla's Majestic of Maple Lodge
Werribee Lilac	5042	19.6.35	9½	3,867	5·39	208·43	230	Jr. 2	.. ..	Werribee Favourite
Werribee Merry Maid ..	2638	8.6.35	11½	5,876	5·73	336·94	350	Mature	214, 310, 300	Yarraview Saxon

* 245 days in test. † 250 days in test. ‡ 240 days in test (herd withdrawn).
§ 210 days in test (herd withdrawn). ‖ 180 days in test (herd withdrawn).

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Longerenong Agricultural College, Dooen, Ayrshire (3).										
Longerenong Acacia Elata	26544	2.6.35	8¾	5,871	4·23	248·50	310	Jr. 4	204, 192 ..	Longerenong Baron
Longerenong Golden Wattle 2nd	26555	4.6.35	9½	4,293	3·99	171·32	230	Jr. 2	.. ..	Longerenong Baron
Longerenong Silver Wattle 2nd	26566	29.4.35	14¼	4,736	4·03	190·80	250	Sr. 2	.. ..	Longerenong Noble
Lowing, Mrs. L., Tongala, Jersey (1).										
Troed-Yr-Rhyw Goleu Dydd 4th	Vol. 23	22.6.35	12	5,423	5·39	292·32	230	Jr. 2	.. ..	Troed-Yr-Rhyw Masterman
Lyon, C. G., Heidelberg, Jersey (5).										
Banyule Frill	42882	9.6.35	14	5,300	5·45	288·62	230	Jr. 2	.. ..	Banyule Amplifier
Banyule Hawthorn 18th ..	42884	5.6.35	20	8,555	5·12	438·32	230	Jr. 2	.. ..	Banyule Triplane
Banyule Silvermine 85th ..	42887	17.6.35	14½	6,285	5·38	338·18	230	Jr. 2	.. ..	Banyule Airo
Banyule Tiddlewinks 10th	37785	20.4.35	24½	8,154	6·14	500·91	310	Jr. 4	286 ..	Banyule Lord Silvair
Rintoul View Triplane's Ivy	45031	2.5.35	19½	7,124	5·19	369·70	290	Sr. 3	264 ..	Banyule Triplane
Lyon, W. H., Sale, Jersey (3).										
Avon Blanchette 15th ..	C.R.	17.6.35	10	6,300	5·35	341·73	270	Jr. 3	308 ..	Jessie 13th's Count of Melrose
*Avon Duchess	Vol. 22	24.4.35	4	4,320	5·20	224·85	230	Jr. 2	.. ..	Bellefaire Blonde Blondex
Avon Lady Elector 5th ..	37790	12.6.35	10	5,649	5·92	334·18	350	Mature	331 ..	Jessie 13th's Count of Melrose
McInnes, A. A., Gunbower, Dairy Shorthorn (1).										
Loch Ness Roseleaf ..	D.S.H.B.A.	16.5.35	8½	5,770	3·95	228·01	330	Sr. 4	279, 209 ..	Royal Duke of Derrimut
McNabb, G. A. and Son, Irrewillipe East, Jersey (16).										
Avalon Noble's Pansy 3rd ..	36833	3.6.35	11	5,523	6·03	332·94	330	Sr. 4	308, 294, 421	Noble of Avalon
Maxon Bright Vanilla ..	37849	27.6.35	15	5,756	5·18	297·95	330	Sr. 4	356, 344, 324	Maxon Starbright's Prince 4th
Maxon Chief's Daisy 2nd ..	Vol. 22	23.5.35	6½	3,800	6·33	240·52	230	Jr. 2	.. ..	Maxon Bright Chief
Maxon Cornice	40931	11.4.35	14	5,907	6·55	386·76	290	Sr. 3	.. ..	Maxon Mercedes Chief 4th
Maxon Countess Light ..	Vol. 22	26.4.35	15	5,604	5·90	330·63	230	Jr. 2	.. ..	Maxon Count Graceful
Maxon Count's Lodestone ..	40932	24.5.35	11½	5,490	6·56	360·08	290	Sr. 3	341, 356 ..	Maxon Count Graceful
Maxon Count's Marie ..	Vol. 22	13.5.35	8½	3,599	5·84	210·09	230	Jr. 2	.. ..	Maxon Count Graceful
Maxon Count's Pansy ..	40933	1.5.35	14	6,258	5·84	365·31	290	Sr. 3	286, 384 ..	Maxon Count Graceful
Maxon Count's Pearl ..	45059	31.3.35	19	6,007	5·69	341·77	250	Sr. 2	269 ..	Maxon Count Graceful
Maxon Graceful Duchess 2nd	Vol. 22	21.5.35	7	4,671	6·04	282·31	230	Jr. 2	.. ..	Maxon Count Graceful
Maxon Mercedes Lodie ..	Vol. 22	25.5.35	9½	3,265	5·86	191·21	230	Jr. 2	.. ..	Maxon Chieftain
Maxon Noble's Alsyke 3rd	Vol. 22	5.6.35	11	3,989	5·85	233·30	230	Jr. 2	.. ..	Avalon Noble 8th
Maxon Noble's Buttercup	45068	30.3.35	24	6,365	5·30	337·58	250	Sr. 2	.. ..	Avalon Noble 8th
Maxon Noble's Daisy ..	34224	2.4.35	15½	6,062	5·82	352·57	350	Mature	222, 379, 339, 410	Avalon Noble 8th
Maxon Noble's Pansy ..	29078	17.6.35	10	6,338	5·32	337·08	350	Mature	334, 396, 339, 475	Noble of Avalon
Maxon Shasta Daisy 2nd ..	Vol. 22	2.6.35	13	5,855	4·56	266·82	230	Jr. 2	.. ..	Maxon Chieftain
Mailer, Dr. R., Shepparton, Jersey (4).										
Maneroo Baroness ..	37882	29.5.35	17½	9,678	6·20	600·23	350	Mature	441, 588 ..	Wompini Royal Duke
Maneroo Buttercup's Daisy	40874	29.3.35	16½	8,176	5·08	414·98	310	Jr. 4	394 ..	Wompini Royal Duke
Maneroo Pearl's Dewdrop	37891	14.5.35	15½	8,246	5·25	432·80	350	Mature	409, 425, 431	Maneroo Duke
Maneroo Twylish Girl ..	40882	22.6.35	15½	7,669	5·33	408·85	290	Sr. 3	.. ..	Maneroo Daphne's Twylish Lad
Messrs. Meaklim Bros., Mooroopna, Dairy Shorthorn (1).										
Drumneil Nellie 3rd ..	D.S.H.B.A.	3.6.35	28½	8,993	3·65	327·89	230	Jr. 2	.. ..	Willow Park Reformer
Middleton, E. M., Hamilton, Jersey (2).										
Jubilee Fern	25474	14.4.35	16½	5,195	5·32	276·16	350	Mature	309 ..	Jubilee Australight
Strathkellar Zoe 2nd ..	46240	12.5.35	16	5,298	4·40	233·23	290	Sr. 3	207 ..	Woodside Reprieve's Volunteer
Moore, J. and Co., Yarram, Jersey (12).										
Tooloonook Angler's Belle 2nd	46461	28.5.35	13	7,148	4·71	336·83	330	Sr. 4	310, 314 ..	Beauty 4th's Command of Somerville
Tooloonook Boltonia 2nd	33541	8.4.35	14½	5,538	5·55	307·49	350	Mature	259, 336, 271, 273	Heroic of Somerville
Tooloonook Boltonia 5th ..	46463	28.5.35	N.O.C.	6,206	5·20	322·88	330	Sr. 4	316 ..	Tooloonook Clianthus Hero
Tooloonook Cheeky 4th ..	46465	25.5.35	8	5,844	4·49	262·35	290	Sr. 3	231 ..	Heroic of Somerville
Tooloonook Lilac Bloom 2nd	46466	6.5.35	12	5,275	6·10	321·74	330	Sr. 4	292, 302 ..	Heroic of Somerville
Tooloonook Maiden 3rd ..	Vol. 22	18.5.35	10½	5,108	4·38	223·67	250	Sr. 2	.. ..	Heroic of Somerville
Tooloonook Molly 5th ..	C.R.	13.5.35	8	3,367	5·14	172·91	250	Sr. 2	.. ..	Tooloonook Belle's Hero
Tooloonook Peach ..	33545	5.5.35	23	8,720	4·72	411·17	350	Mature	282, 358, 338, 384	Tooloonook Carob's Hero
Tooloonook Peach 3rd ..	C.R.	29.3.35	14½	5,531	5·68	314·02	310	Jr. 4	306 ..	Heroic of Somerville
Tooloonook Peach 4th ..	46471	17.4.35	13	5,429	4·71	255·69	290	Sr. 3	236 ..	Heroic of Somerville
Tooloonook Sainfoin ..	33546	9.6.35	5	3,981	5·21	207·59	350	Mature	296, 241, 357	Dauntless of Somerville
Tooloonook Trixie 11th ..	42250	22.4.35	18½	6,105	4·69	286·24	330	Sr. 4	254 ..	Heroic of Somerville

* 240 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Nicholas, A. M., Sherbrooke, Jersey (2).										
Jubilee Weigelia ..	40438	18.4.35	20	7,262	5·14	373·62	310	Jr. 4	223, 368 ..	Jubilee Asterlight
Selsey Brown May ..	Vol. 22	29.4.35	20½	7,632	6·50	496·19	270	Jr. 3	.. ..	Retford Glider
Nilsson, P. O., Tynong, Jersey (1).										
Yanguren Bluebell's Rose	Vol. 22	5.5.35	13	7,406	4·89	362·11	230	Jr. ?	.. ..	Rosyth Romany Prince
Noble, T. M. and Son, Maffra, Jersey (2).										
Finchley Harebell ..	Vol. 22	9.4.35	13	5,277	5·97	315·26	230	Jr. 2	.. ..	Finchley Masterman
Jerseyinn Nasturtium 2nd	33568	7.4.35	20	7,733	5·47	423·05	350	Mature	337, 421, 357	Werribee Bluebell's Masterpiece
Norman, J. G., Pennyroyal, Jersey (1).										
*Baunaview Lilac Domino 2nd	Vol. 23	11.6.35	..	4,950	5·97	295·62	230	Jr. 2	.. ..	Banyarra Novar
Overend, Mrs. A. C., Sale, Jersey (3).										
Bon Accord Belle ..	33576	4.6.35	16½	7,397	5·78	427·51	350	Mature	293, 335, 288, 428	Bon Accord David
Bon Accord Bright Spark	38949	29.3.35	10½	6,475	5·30	343·32	290	Sr. 3	196, 361 ..	Bon Accord John
Bon Accord Island Gem ..	25576	6.4.35	17½	6,767	5·67	383·39	350	Mature	271, 270, 367, 427, 227, 481	Lord Island Fancy of Brucevale
Payne, A. E. T., Lilydale, Guernsey (5).										
Rose Gem of Maple Lodge (Imp.)	3933	18.5.35	29	13,193	4·61	607·97	350	Mature	.. ..	Conqueror
Yarraview Daffodil 3rd ..	5166	4.5.35	14	6,165	4·34	267·63	230	Jr. 2	.. ..	Nundorah King Daffodil
Yarraview Dawn ..	3553	23.6.35	13	6,792	5·15	349·73	310	Jr. 4	.. ..	Camellia's Majestic of Maple Lodge (Imp.)
Yarraview May	3564	19.5.35	10½	6,717	5·25	352·61	290	Sr. 3	.. ..	Majestic (Imp.)
Yarraview Patricia ..	2238	18.4.35	16½	6,846	5·85	400·79	350	Mature	.. ..	Yarraview Diamond 2nd
Pearson, J., Nerrena East, Jersey (3).										
Warrawee Heather ..	Vol. 22	20.5.35	12	4,949	5·42	268·06	270	Jr. 3	297 ..	Banyule Tympani
Warrawee Ruby ..	Vol. 22	6.4.35	14½	4,968	5·92	294·23	250	Sr. 2	.. ..	Banyule Tympani
†Warrawee Soprano ..	Vol. 22	17.6.35	4	5,070	5·74	291·06	270	Jr. 3	325 ..	Banyule Tympani
Phillips, J. H., Speewa, Jersey (1).										
Vanilla of Peri	18914	25.5.35	25	8,558	5·19	444·20	350	Mature	286, 302, 366, 375, 327, 405, 470	Carnation's Bosun of Peri
Pollard, C. F., Bonegilla, Jersey (3).										
Bonegilla Daisy	38051	7.6.35	8½	5,184	6·00	310·80	350	Mature	277 ..	Dahlia's Starbright Prince of Roselands
Bonegilla Daphne ..	Vol. 22	1.6.35	9	4,718	5·77	272·06	230	Jr. 2	.. ..	Avalon Gladstar 18th
Bonegilla Holly	Vol. 22	10.5.35	4	3,852	6·40	246·37	230	Jr. 2	.. ..	Avalon Gladstar 18th
Raleigh, Miss H. E., Pakenham Upper, Jersey (2).										
Mornmoot Modiste 2nd ..	33140	16.4.35	20	6,441	6·33	407·79	350	Mature	360, 411, 453	Werribee Prince Madeira
Unanderra Carmen 5th ..	C.R.	9.5.35	15	4,347	5·33	231·87	230	Jr. 2	.. ..	Wompini Irish Lad
Read, J. D., Springhurst, Jersey (19).										
Springhurst Alskye 4th ..	29329	16.4.35	17	7,913	5·92	468·32	350	Mature	303, 406, 456, 514, 473	Starbright's Prince of Glen Iris
Springhurst Angelica Tecoma	Vol. 22	4.5.35	20	6,210	5·78	359·23	230	Jr. 2	.. ..	Bellefaire Seaborn Successor
Springhurst Blonde Medick	46178	31.3.35	19	6,788	5·80	393·93	250	Sr. 2	305 ..	Bellefaire Seaborn Successor
Springhurst Blonde Tecoma	46179	2.4.35	18	6,648	5·47	363·45	230	Jr. 2	.. ..	Bellefaire Seaborn Successor
Springhurst Blonde Tomato	46180	4.4.35	19½	6,990	5·42	379·09	230	Jr. 2	.. ..	Bellefaire Seaborn Successor
Springhurst Brinjal ..	46181	2.4.35	19½	7,754	5·77	447·39	250	Sr. 2	356 ..	Bellefaire Seaborn Successor
Nardoo of Springhurst ..	18936	29.3.35	25	8,418	6·08	511·91	350	Mature	301, 458, 386, 553, 618, 674, 506, 558	Starbright's Prince of Glen Iris
Springhurst Soya ..	38107	9.5.35	20½	8,106	5·33	431·92	310	Jr. 4	366, 415 ..	Starbright's Prince of Glen Iris
Springhurst Sybil Aconite ..	46188	18.4.35	24½	9,143	5·43	496·83	250	Sr. 2	379 ..	Bellefaire Seaborn Successor
Springhurst Sybil Alsyke ..	46189	27.4.35	27	8,720	5·58	486·78	250	Sr. 2	438 ..	Bellefaire Seaborn Successor
Springhurst Sybil Frangipani	Vol. 22	22.6.35	18	7,197	5·11	367·47	230	Jr. 2	.. ..	Bellefaire Seaborn Successor
Springhurst Sybil Gladiolus	46190	1.4.35	12	4,601	5·91	271·75	230	Jr. 2	.. ..	Bellefaire Seaborn Successor
Springhurst Sybil Medick ..	41999	21.4.35	21½	7,998	6·63	524·31	290	Sr. 3	356, 376 ..	Bellefaire Seaborn Successor
Springhurst Sybil Narcissus	46191	8.6.35	23	10,365	5·15	533·84	250	Sr. 2	369 ..	Bellefaire Seaborn Successor
Springhurst Sybil Nerine ..	46192	4.4.35	23	7,907	5·83	460·98	230	Jr. 2	.. ..	Bellefaire Seaborn Successor
Springhurst Sybil Tecoma ..	46193	16.5.35	23½	8,540	4·59	391·61	250	Sr. 2	333 ..	Bellefaire Seaborn Successor
Springhurst Sybil Tomato ..	46194	25.4.35	24½	9,392	5·54	520·37	250	Sr. 2	431 ..	Bellefaire Seaborn Successor
Tomato of Springhurst ..	18939	16.4.35	25	8,688	5·16	448·43	350	Mature	302, 533, 604, 567, 594, 563, 544, 495	Alloy of Banyule
Springhurst Tomato 2nd ..	26175	22.5.35	20	7,736	5·88	454·71	350	Mature	340, 410, 542, 462, 469	Starbright's Prince of Glen Iris

* 210 days in test (herd withdrawn). † 240 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.		Sire.
Rechenberg, J. F., Marshall, Ayrshire (7).											
Camelot Dahlia	C.R.	13.6.35	10½	5,543	4·61	255·65	230	Jr. 2	..	..	Gowrie Park Squire
Camelot Honeysuckle ..	C.R.	27.4.35	11	5,930	3·96	234·81	230	Jr. 2	..	..	Gowrie Park Squire
Camelot Maiden	C.R.	26.4.35	13	6,162	4·00	246·43	230	Jr. 2	..	..	Gowrie Park Squire
Camelot Mavis	24666	1.5.35	10½	6,801	4·25	289·00	350	Mature	343, 319	..	Scotswood Adonis Earl
Camelot Merle	C.R.	14.5.35	9	4,775	4·44	212·00	230	Jr. 2	..	..	Gowrie Park Squire
Camelot Nora	C.R.	16.4.35	8½	5,013	4·66	233·78	230	Jr. 2	..	..	Camelot Baron
Gala Charm	C.R.	18.4.35	16	6,713	4·10	275·33	230	Jr. 2	..	..	Gowrie Park Squire
Rentsch, A., Tabor, Australian Illawarra Shorthorn (3).											
Allawalla Daisy 7th ..	8672	21.4.35	..	5,764	4·80	276·94	310	Jr. 4	284	..	Egbert of Allawalla
Allawalla Model 2nd ..	8675	3.5.35	5½	6,437	4·19	270·03	350	Mature	287, 203	..	Premier of Fairfield
Alne Bank Marjory 2nd ..	8721	11.5.35	16	7,052	4·36	307·44	250	Sr. 2	..	..	Alne Bank Dolly's Gift
Ronalds, O., Tarago, Jersey (1).											
Somerville Air Beauty ..	38183	14.4.35	30	8,813	5·81	512·35	330	Sr. 4	434, 507	..	Banyule Aeronaut
Salesian College, Sunbury, Aryshire (1).											
Mount Noorat Poppy ..	24148	10.4.35	14	6,321	4·31	272·12	350	Mature	294, 364	..	Sparrovale Brilliant
Salesian College, Sunbury, Friesian (4).											
Ingolston Domino's Beauty	3528	11.6.35	14½	10,134	3·36	340·58	350	Mature	387	..	Ingolston Dutch Domino
Ingolston Inka Josie ..	3532	17.6.35	34	16,955	3·51	594·41	350	Mature	441, 627	..	Awapuna Dutchman
Ingolston Joan	Vol. 13	30.3.35	15	6,956	3·61	251·00	270	Jr. 3	332	..	Cordyline Cremona Pontiac
Ingolston Milkmaid ..	4101	30.5.35	13	7,890	3·61	284·64	330	Sr. 4	380	..	Greenvale Ideal Segis
Schlipalius, A. J., Kilmany South, Jersey (1).											
Fairbank Princess Ida ..	39702	11.6.35	11½	5,109	5·92	302·48	290	Sr. 3	267, 262	..	Wompini Beau Brummel
Scott, F. E. S., Scotsburn, Dairy Shorthorn (2).											
Yuulong Blossom ..	D.S.H.B.A.	3.5.35	9	4,710	4·10	192·94	270	Jr. 3	..	..	Willow Park Imperial 3rd
Yuulong Treasure ..	D.S.H.B.A.	22.5.35	15	6,060	4·12	249·53	250	Sr. 2	..	..	Willow Park Treasurer
Smith, E. L., and Sons, Woodend, Friesian (1).											
Roads End Navalia ..	4233	11.5.35	25	10,998	3·05	334·94	350	Mature	335, 287	..	Roads End Vindex
Smith, G. and W., Fish Creek, Jersey (3).											
Rydon Belle	41020	25.6.35	20	7,190	5·56	399·98	290	Sr. 3	347	..	Melrose Migrant
Rydon Petal	24606	23.6.35	21	8,544	5·50	469·91	350	Mature	371, 453, 396, 447	..	Prince Bob of Glenmoor
Rydon Rosalind	29491	7.6.35	17½	7,391	6·14	453·79	350	Mature	335, 325, 329, 341		Burnside Monitor
Taylor, C. G., Highton, Jersey (1).											
Maindale Jeanette ..	37895	4.4.35	13	7,592	5·68	431·43	330	Sr. 4	..	..	Rosedale View Maid's King
Tomasetti, B. G., Drouin West, Ayrshire (2).											
Glencorren Lilac	22832	27.5.35	18	9,959	5·42	539·40	350	Mature	393, 378, 488		Scotswood Michael 2nd
Glencorren Margaret ..	Vol. 28	7.5.35	16	6,987	4·34	302·95	250	Sr. 2	..	..	Scotswood Michael 2nd
Tuckey, J. F., Alberton, Ayrshire (3).											
Irene of Tregorland ..	14265	14.5.35	15	7,340	4·82	353·46	350	Mature	300, 262, 184, 310, 344, 386, 372		Bonnie Earl of Gowrie Park
Tregorland Kandy ..	26782	20.4.35	18	8,367	4·65	388·77	290	Sr. 3	265	..	Gowrie Park Scottish Minstrel
Tregorland Tulip ..	Vol. 28	23.5.35	22	8,535	4·58	390·69	290	Sr. 3	237	..	Gowrie Park Royal Scot
Underwood, N. D., Alphington, Jersey (1).											
Karoola Rita	Vol. 22	30.4.35	14	4,604	4·73	217·69	230	Jr. 2	..	..	Glenallan Mariposa
Vagg, E. J., Leongatha, Jersey (2).											
Bounay Midget's Winnie ..	38976	7.6.35	17	6,114	5·89	359·99	330	Sr. 4	339, 336	..	Welbourne Handsome Boy
Bounay Mystery Maid 3rd	33861	7.6.35	20	7,863	4·66	366·60	350	Mature	297, 357, 412, 424		Welbourne Handsome Boy
Van Brummelen, J. K., Ferntree Gully, Friesian (2).											
Bolero Rosebelle's Rosina	Vol. 13	18.5.35	25½	11,013	3·58	393·81	290	Sr. 3	300	..	St. Albans Queen's Korndyke 2nd
Bolero Sylvia's Rose Mary	Vol. 13	19.5.35	29½	13,907	3·27	455·00	270	Jr. 3	395	..	St. Albans Queen's Korndyke 2nd
Vaughan Bros., Girgarre, Jersey (2).											
Lynroy Gladys 3rd ..	Vol. 22	14.6.35	13	4,709	5·50	259·10	230	Jr. 2	..	..	Werribee Laverock
Lynroy Princess Gladys ..	Vol. 22	15.5.35	22½	6,956	5·30	368·43	250	Sr. 2	..	..	Werribee Laverock
Wade, W. J., Stratford, Jersey (1).											
Inverbroom Silver Molly ..	40289	3.5.35	22	7,157	4·81	344·32	290	Sr. 3	219, 305	..	Economist of Aveley
Walker, C. S., Swan Hill, Jersey (1).											
Gum Park Cream Lass ..	44232	6.4.35	10	4,987	5·32	265·34	250	Sr. 2	266	..	Starlight of Bellair

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Wallace, A., Kennington, Jersey (4).										
Grovelea Busy Bee ..	44229	26.4.35	17	6,572	4·30	282·52	290	Sr. 3	.. ..	Thornbury Bonnie Boy
Myall Dainty Flower ..	28712	3.4.35	15	5,462	4·25	232·12	350	Mature	.. ..	Myall Dainty Lad
Myall Sybil	41204	26.5.35	17½	7,452	4·86	362·00	290	Sr. 3	.. ..	Kyora Foch
Preston Bloom	38499	11.5.35	20½	6,825	4·25	290·00	350	Mature	243, 294 ..	Preston Pretty Boy
Warragul High School, Warragul, Red Poll (2).										
Gipps Fiona	2388B	30.3.35	17	9,069	4·14	375·01	350	Mature	287, 344, 264	Woodburn Laureate
Gipps Zuleika	3663A	6.5.35	15	5,650	4·28	241·56	250	Sr. 2	.. ..	Gipps Byron
Webb, R. A., Irrewarra, Jersey (1).										
Clarendon Eyre Utopia ..	29628	23.6.35	14	7,770	5·44	422·70	350	Mature	444, 432, 383	Eminent's Achievement of Clarendon Eyre
West, J. C., Notting Hill, Illawarra Milking Shorthorn (2).										
Birdie 2nd of The Pines ..	18146	1.6.35	13½	7,059	3·92	300·24	350	Mature	282, 387, 391, 369	Hero of Lemon Grove
Grange Lea Tottie 2nd ..	11292	15.6.35	15	7,622	3·83	291·68	230	Jr. 2	.. ..	Parkview Guardsman
White, R. T., Cardigan, Ayrshire (1).										
Dookie Victoria	Vol. 28	21.5.35	20	7,256	4·56	331·04	230	Jr. 2	.. ..	Dookie Patron
Wilson, D. C., Derrinallum, Jersey (4).										
Ayton Law Fern ..	25654	24.5.35	8½	6,828	4·12	281·38	350	Mature	229, 237, 301, 198, 291	Wagga Yambil's Goddington Noble
Ayton Law Fern 3rd ..	38758	20.5.35	9	7,097	5·11	362·78	310	Jr. 4	191, 322 ..	Ayton Law Quality's Noble 2nd
Ayton Law Tressa	42841	19.5.35	8½	5,588	5·24	292·87	330	Sr. 4	284, 226 ..	Ayton Law Quality's Noble 2nd
Melksham Pansy 20th ..	33924	1.5.35	9½	5,426	5·31	288·32	350	Mature	299, 215, 251	Royal Duke of Melrose
Wood, J. V. M., Heidelberg, Jersey (1).										
Clarendon Eyre Little Buttercup 2nd	29624	12.6.35	31	8,479	5·65	478·91	350	Mature	370, 435, 497, 521, 497	Clarendon Eyre Rose's Eminent

TESTED SIRES.

Hereunder is a list of sires one or more of whose progeny in the test for the quarter ended 31st March last yielded 100 lb. butter-fat in excess of that required to qualify for certificate. The quantity of butter-fat required for certificate in the various classes plus the additional 100 lb. is indicated at the top of the several columns, and the figures shown opposite the name of each sire are the yields of butter-fat from individual heifers or cows by that sire.

Name of Sire.	Breed.	CLASS.						
		Jr. 2 330 lb.	Sr. 2 350 lb.	Jr. 3 370 lb.	Sr. 3 390 lb.	Jr. 4 410 lb.	Sr. 4 430 lb.	Mature 450 lb.
Admiral of Leura	Jersey ..	..	..	..	..	..	..	542
Avalon Mercedes Chief 16th ..	Jersey ..	..	..	..	..	..	476	..
Awapuna Dutchman	Friesian ..	..	..	..	..	..	..	594
Banyule Aeronaut	Jersey ..	..	..	..	..	456	512	..
Banyule Aero	Jersey ..	338	..	..	..	..	..	..
Banyule Lord Silvair	Jersey ..	..	..	..	..	501	..	..
Banyule Triplane	Jersey ..	438	..	..	..	..	..	..
Bellefaire Seaborn Successor ..	Jersey ..	359 363 379 367 461	394 447 497 487 534 392 520	..	524	..	..	..
Brucevale Lord Starbright	Jersey ..	..	499	..	..	..	..	..
Burnside Monitor	Jersey ..	..	..	..	..	..	..	454
Clarendon Eyre Rose's Eminent ..	Jersey ..	..	..	..	..	..	..	479

TESTED SIRES.—*continued.*

Name of Sire.	Breed.	Class.						
		Jr. 2 330 lb.	Sr. 2 350 lb.	Jr. 3 370 lb.	Sr. 3 390 lb.	Jr. 4 410 lb.	Sr. 4 430 lb.	Mature 450 lb.
Clarendon Eyre Student Prince	Jersey	..	..	..	394	..	..	..
Conqueror	Guernsey	..	..	..	..	..	..	608
Curiosity's King of Comely Banks	Jersey	..	..	..	..	..	..	564
Design's Ruler (Imp.)	..	..	414	..	..	..	..	..
Dominion Oakdale	Friesian	..	..	..	..	..	457	..
Dookie Pater	Ayrshire	..	..	..	..	..	..	490
Dookie Patron	Ayrshire	331	..	..	..	..	..	..
Gadabout of Danton	Jersey	..	..	..	..	..	..	491
Glen Alvie Statesman	Jersey	..	375	..	..	..	..	..
Goldspeck of Tooravale	Jersey	..	..	..	394	..	..	..
Gowrie Park Royal Scot	Ayrshire	..	..	..	391	..	..	..
Kantara Don Juan	Jersey	..	360	..	..	..	..	..
Karalee Volunteer 8th	Jersey	334	..	..	..	..	..	..
Longerenong Laurie	Ayrshire	..	..	..	..	..	..	501
Maneroo Daphne's Twylish Lad	Jersey	..	..	..	409	..	..	..
Maxon Count Graceful	Jersey	331	..	..	..	..	..	..
Melrose Butterman	Jersey	..	..	..	..	420	..	..
Melrose Migrant	Jersey	..	..	..	400	..	..	..
Mistletoe 2nd's V.C. of Tarnpirr	Jersey	..	..	..	..	..	..	454
Noble of Avalon	Jersey	..	..	398	..	..	..	..
Normandie Golden Peer	Jersey	352	..	..	..	..	..	..
Normandie Majestic	Jersey	..	..	416	..	..	..	..
Peer of Lewisham	Jersey	..	376	..	..	..	514	475
Prince Bob of Glenmoor	Jersey	..	..	..	..	..	..	470
Retford Glider	Jersey	..	..	496	..	..	..	..
Rosedale View Maid's King	Jersey	..	..	..	..	..	431	..
Rosella 2nd's Noble of Rosemont	Jersey	..	..	..	..	..	..	469
Rosyth Romany Prince	Jersey	362	..	..	..	..	..	..
St. Albans Queen's Korndyke 2nd	Friesian	..	..	455	394	..	..	..
Scotswood Michael 2nd	Ayrshire	..	..	..	..	..	..	539
Staghorn Larkspur's Majestic	Jersey	551	..	..	..	..	..	..
Starbright's Prince of Glen Iris	Jersey	..	..	..	..	432	..	468 512 455
Studleigh Dandy	Jersey	..	..	385	..	..	474	..
Victoria Double Oak De Kol	Friesian	..	..	..	..	..	..	453
Victoria Jack Tar	Jersey	..	..	..	..	..	..	485
Victoria Topnote	Friesian	..	..	..	418	..	..	..
Warenda Ragtime Dominant	Jersey	..	..	..	401	..	..	..
Warenda Snap	Jersey	..	..	..	..	..	..	471
Werribee Bluebell's Masterpiece	Jersey	336	..	..	..	..	..	..
Werribee Fancy Masterpiece	Jersey	342	..	..	..	..	..	..
Werribee Madeira Starbright's King	Jersey	..	..	..	..	..	..	458
Werribee Master's Expert	Jersey	..	..	389	..	..	..	..
Wompini Royal Duke	Jersey	..	..	..	..	415	..	600

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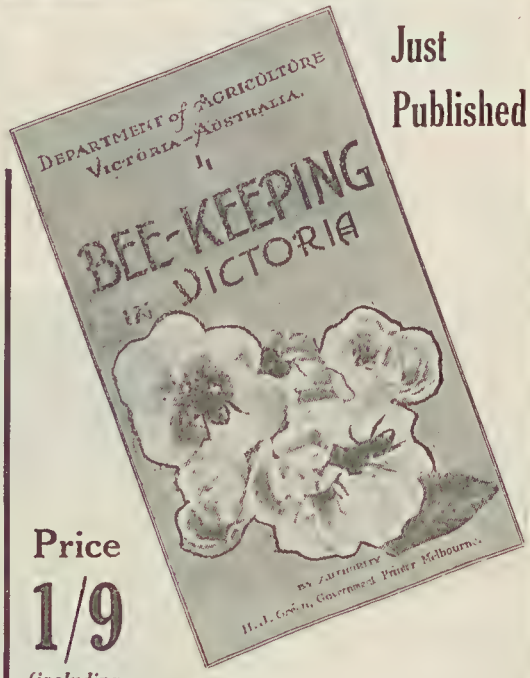

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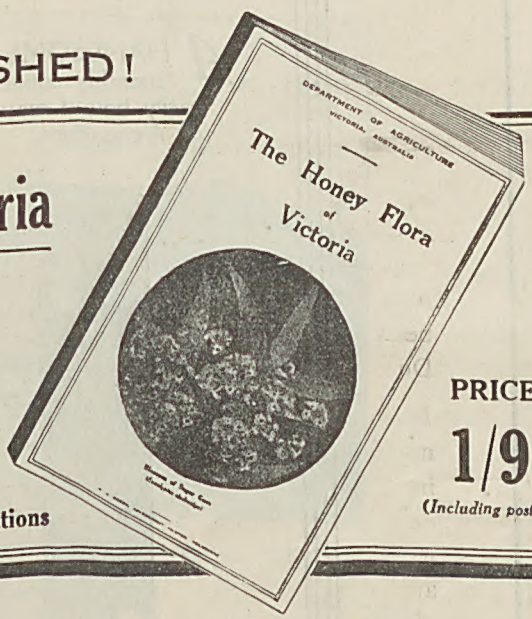

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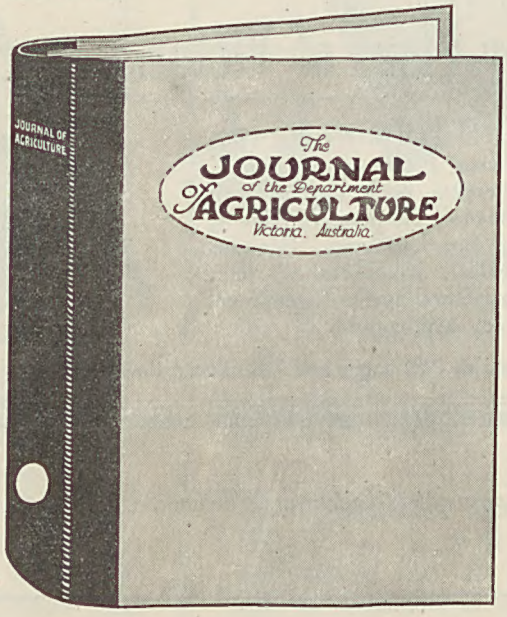

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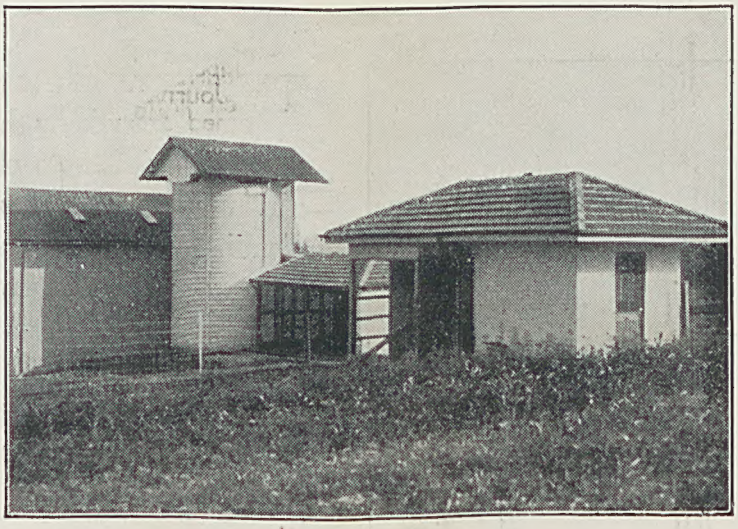

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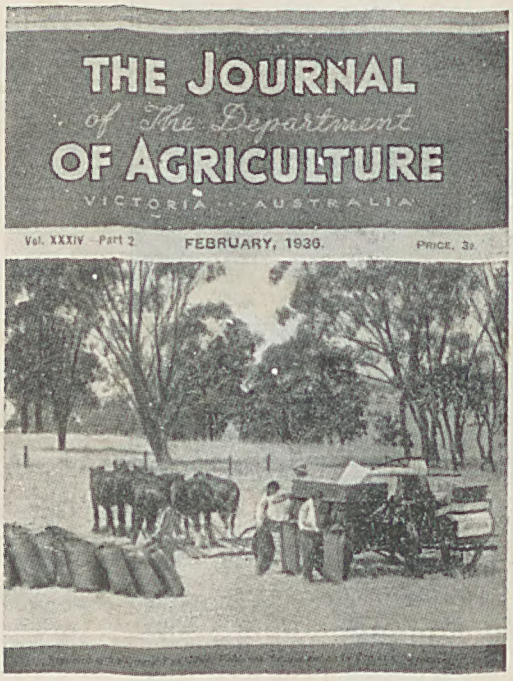

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